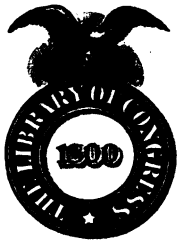

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HEARINGS

BEFORE THE

U.S. Congress. House.

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,

HOUSE OF REPRESENTATIVES,

CONSISTING OF

Messrs. WALTER I. SMITH (chairman), J. W. KEIFER, J. V. GRAFF, J. J. FITZGERALD, and STEPHEN BRUNDIDGE, Jr.,

IN CHARGE OF

THE FORTIFICATION APPROPRIATION BILL,

WASHINGTON:
GOVERNMENT PRINTING OFFICE
1906.

FORTIFICATION APPROPRIATION BILL.

Hearings conducted by the subcommittee, Messrs. W. I. Smith (chairman), J. W. Keifer, J. V. Graff, J. J. Fitzgerald, and S. Brundidge, jr., of the Committee on Appropriations, House of Representatives, in charge of the fortification appropriation bill, on the days following, namely:

WEDNESDAY, *December 5, 1906.*

ORDNANCE DEPARTMENT.

STATEMENT OF BRIG. GEN. WILLIAM CROZIER, CHIEF OF ORDNANCE, UNITED STATES ARMY, ACCOMPANIED BY MAJ. O. C. HORNEY AND MAJ. L. M. FULLER, ASSISTANTS TO THE CHIEF OF ORDNANCE.

HIGHER PRICES.

Mr. SMITH. Shall we now take up the items beginning at the bottom of page 7?

General CROZIER. I would like to say in the beginning, Mr. Chairman, that since these estimates were made up all the proposals that we have had to furnish material have stated prices very considerable in excess of those that we put in the estimates and which we had thought were liberal. The price for everything seems to have gone up very much, and these amounts that are estimated through this bill I do not believe will do what they are estimated to do within 15 per cent.

Mr. KEIFER. Are these advances on iron and steel and things of that kind?

General CROZIER. That class of work. I will give you an illustration: To make a disappearing gun carriage for a 6-inch gun, which is the smallest disappearing gun carriage that we make, and which weighs altogether—that is, all of the material in it—very nearly 50 tons, has been costing us from $10,000 to $12,000. We estimated for a small number of them $15,000. On opening the bids the other day I found that the lowest bid was $18,900. We have noticed the rising tendency of prices, and in our estimates allowed $15,000 apiece for the carriages, but a fortnight ago, when we opened the bids, the lowest bid was $18,900.

Now, of course that does not tell the whole story, which is added to by the statement that we advertised for only three, which is a very small number, and consequently some of the bidders would have to charge for patterns and all that sort of thing, while, on the other hand, one of the bidders, the lowest one, was already making these carriages and had those things on hand, and the reason why he was the lowest bidder was because he had those things on hand.

Mr. SMITH. May I ask whether, in your judgment, it is the fact that there is real competition on this material on which you have offers?

General CROZIER. Yes; there is real competition on that. There are some things that we do not have it on. We do not have real competition on steel forgings for large guns. They are only furnished by two establishments, and they make the same bid every time for furnishing the material. Gun carriages are things which can be made in any well-appointed machine shop, and we do get competition on them.

Mr. SMITH. So that this rise in price is not due, you think, to any combination?

General CROZIER. Not at all. This illustration that I have given you is one which is not affected by any combination. The people who made the bids, I know, have nothing to do with that.

Mr. BRUNDIDGE. How do you account for such an unusual rise, or do you account for it? Do you have any idea about that?

General CROZIER. From all that I can hear I should say, simply, that gold is not worth so much, because its production has greatly increased in recent years. Of course, in prosperous times prices always rise, but I do not think that is enough to account for it. The real reason is that the production of gold has increased so much that it is not worth what it was before. You have to pay more for everything else, but other things have not increased in price in the same proportion that gold has decreased in value.

General KEIFER. While you are on that point, has not steel and iron and iron ore gone up from 40 to 60 per cent within the last few months?

General CROZIER. That is true, General, but a very large proportion of the cost of those classes of material is the labor, and the labor has to be compensated in accordance with what it costs to live. We find the same thing in the Government establishments. We have had to increase the pay of all mechanics, laborers, workmen, and it is only those who are on fixed annual salaries who are going on the same pay as before, and I am not certain that it is not an injustice to them, because their salaries will not do for them what it did five years ago.

General KEIFER. Do these bidders make any statement themselves as to the reason for this increased price?

General CROZIER. They simply make the general statement that higher prices for material and labor cause the rise. Leather work is another. We have that appropriated for in this bill—pack saddles for machine guns, and so forth. That has increased in the same way, though not in quite such a large proportion as iron and steel machine work, but very considerably. I suppose that that can not altogether be considered a misfortune, because for exactly the same causes the revenues of the Government increase.

ARMAMENT OF FORTIFICATIONS.

ALLOTTED AND TREASURY BALANCES.

Mr. SMITH. We will now take up the first item at the bottom of page 7. I think perhaps we had better this year, as in former years, have your balances, if you can give them to us to-day. Up to what date can you give them?

General CROZIER. I can give the balances which I have not allotted, which are unmortgaged and are free for purposes of appropriation, up to December 3.

Mr. SMITH. How late can you give the Treasury balances?

General CROZIER. Most of them up to the same date, December 3.

General KEIFER. You say you can give the balances of appropriations not allotted? Do you mean by that that you will not have to allot them for work already commenced?

General CROZIER. They will not have to be used for work already commenced. When I say "allotted," I mean by myself.

Mr. SMITH. A great deal of it is allotted by you for work not commenced at all; you allot a certain amount by contract?

General CROZIER. I ought to define the word "allotment" as I use it. When I speak of the sum which I allot, I mean the sum which we charge with either buying or making something, or something that is ordered bought or made, and which sum is set aside for our use in carrying out the order.

Mr. SMITH. The allotment always precedes any work being done with that money?

General CROZIER. It is coincident with it. I send an order to the commanding officer of the Rock Island Arsenal to manufacture twenty-five 3-inch field gun carriages, and if I know how much they will cost, I will allot him at that time enough money for the purpose; otherwise, I will allot him enough money to commence them, and tell him to send me an estimate before I allot the rest. No work is allowed to proceed before money is allotted.

Mr. SMITH. Before any work is done the allotment is made?

General CROZIER. Yes, it is; if I know what it is going to cost, or if I have been given an estimate of what it is going to cost. Also, when I make purchases under advertisement; for instance, if I were to have these same gun carriages made under contract, then I make an allotment of what I think it is going to cost before I advertise. In that sense that kind of an allotment is made before the work commences.

General KEIFER. Then your allotment is equivalent to the expenditure of that much money, is it not?

General CROZIER. It is equivalent to the hypothecating of it; it orders the processes which require the expenditure.

General KEIFER. Unless the work which it is allotted to pay for is suspended, then the money goes through as though it had actually been paid out?

General CROZIER. Exactly.

Mr. SMITH. I think, General, that will leave an erroneous impression in the record. As a matter of fact, whatever money you allot for Government work at the arsenals is simply expended from time

to time thereafter in keeping the arsenal running upon the work you have ordered done; it keeps the arsenal open and running to that extent in the future.

General CROZIER. General Keifer said that unless that work should be suspended——

Mr. SMITH. But you would not mean to answer that in the affirmative, because if it was expended you would have no money to run the arsenal with; so that it is not the same as an expenditure, because if it was expended the arsenal would close.

General KEIFER. It is expended within the year.

Mr. SMITH. It may be expended within two or three years. It is not necessarily an expenditure under this bill. These appropriations are available until expended.

General KEIFER. I simply wanted to find out whether we can make our appropriations with reference to the money allotted by the proper officer of the Department, or whether we have to make it independently.

General CROZIER. What I am endeavoring to make clear is the very considerable difference which always exists between my statement of the balances remaining unallotted and the Treasury statement of the balances in the Treasury. Those differ very much. My statement of balances are the sums that I have remaining, out of which I can order work that has not yet been ordered. Of course, it must be work that has been appropriated for. The balances of the Treasury include not only those sums, but the sums which have not yet been paid out for work which has been ordered. Sometimes the sums remain in the Treasury for a long time before they are paid out for work ordered.

Mr. SMITH. Not meaning to say that it is not true, yet it would be entirely possible for you to have allotted for work at the Rock Island Arsenal sufficient money to keep it running for ten years, if you had the money.

General CROZIER. Yes, sir.

PURCHASE, MANUFACTURE, AND TEST OF MACHINE AND AUTOMATIC GUNS.

Mr. SMITH. Will you give us the Treasury balances under this first item, as of date December 3?

General CROZIER. That is for machine guns. The Treasury balance is $257,503.57.

Mr. SMITH. And the available balance is how much?

General CROZIER. Forty-six thousand dollars.

Mr. SMITH. Now, I would like to ask you whether this item covers work done by contract or work done by the Government.

General CROZIER. It covers both. We get the guns themselves by contract, and we make the pack outfits and possibly the shields which go with the guns. We do those things ourselves.

Mr. SMITH. Would you be able to tell us how much of the allotment already made under this item is for contract work as distinguished from work done by the Government itself?

General CROZIER. The difference between this $257,000 and $46,000 will have to be paid out for contract work.

Mr. SMITH. As to each of these items, so far as practicable, I would like to obtain information, first, as to the Treasury balance; second,

as to the available balance, and, third, as to the portion of the allotment which is contract work and the portion which remains for the doing of work in the Government shops—that is, of the allotted proportion.

General CROZIER. In regard to most of the items I can give you an approximate statement as to that now.

AUTOMATIC MACHINE GUNS, NUMBER OF.

Mr. SMITH. This is an estimate for your automatic machine guns of different caliber, pack outfits, etc. What number are you seeking to ultimately have of this type of guns?

General CROZIER. Nine hundred and thirty-five.

Mr. SMITH. For an army how large?

General CROZIER. On the following scheme: We propose to have for the seacoast fortifications, for repelling land attack and efforts to get behind the fortifications and capture the personnel, as distinguished from an attack by vessels at sea, 200.

General KEIFER. Please say what you mean by 200. Are those intended for seacoast fortifications?

General CROZIER. Yes. It is intended to have two guns for each regiment of infantry or cavalry. We contemplated first one for each battalion, but now we have tentatively a scheme of two for each regiment. That would leave 735 for that kind of use, the use of regiments. Two for each regiment would give half as many regiments—something over 300—and, roughly, at a thousand men for a regiment, would be 300,000 men.

Mr. SMITH. There would be 1,200 men in a regiment, would there not?

General CROZIER. Then that would make 360,000.

Mr. SMITH. So this equipment is practically, with 1,200 men in a regiment, for an army of 40,000 men?

General CROZIER. Yes.

Mr. SMITH. How many of these 200 guns for seacoast fortification use are needed for seacoast fortifications now constructed; and how many are for other fortifications covered by the Taft Board's report?

General CROZIER. Practically all of them are needed for seacoast fortifications now constructed, because all of the harbors which it is contemplated to defend by these defenses in the report of the Taft Board have already defenses constructed thereat, excepting the mouth of the Chesapeake Bay, and the estimates for the completion of the coast defenses of the United States are for additions to the defenses of the harbors which are already partially defended.

Mr. SMITH. You say that all of the points, excepting Cape Henry—I speak of Cape Henry as covered in that locality—have been fortified?

General CROZIER. Yes; all points that are contemplated for fortifications.

Mr. SMITH. When you get these guns, do you divide them in any way, excepting on paper, as between defense of the seacoast fortifications and use by the line of the Army or militia in time of war?

General CROZIER. There is a partial division in that all the regiments of the Regular Army have these guns, and also it is expected

that the regiments of the militia will have them, because the law requires that the militia shall be armed in the same way as the regular force. There is also a partial division of those which are intended for the seacoast fortifications. The guns of this class which are intended for mobile armies are designed to be carried on pack saddles, and those that are intended for the seacoast fortifications are mounted on wheeled mounts, and that makes a difference.

General KEIFER. A difference in cost?

General CROZIER. Something of a difference in cost, but a difference in use. The wheeled mounts are not adapted to accompany moving armies in the field.

General KEIFER. Is the same character of ammunition used in these guns as in the rifles?

General CROZIER. Yes, sir.

General KEIFER. That is, the Krag-Jörgensen .30 caliber?

General CROZIER. We have passed beyond that; it is the model of 1903. The same ball, but a different charge of powder.

General KEIFER. It is the same caliber?

General CROZIER. Yes.

Mr. SMITH. In the present system of the organization of the Army by whom are these guns operated when assigned to a cavalry or infantry regiment—that is, are they operated by enlisted artillerymen or men enlisted as infantrymen or cavalrymen?

General CROZIER. By men enlisted as infantry or cavalry.

Mr. SMITH. And in the operation of these guns in connection with seacoast fortifications are they operated by artillerymen or by other branches of the service?

General CROZIER. Artillerymen.

Mr. SMITH. So that there may be said to be another division of these guns in one sense, in that a portion of them are turned over to an artillery branch of the service, while the rest are not. Is that correct?

General CROZIER. Yes.

Mr. SMITH. How many of these guns that have been constructed have been turned over to the artillery thus far?

General CROZIER. None. We have thus far actually procured and had delivered only 90 of those guns. We have 30 regiments of infantry and 15 regiments of cavalry, making 45 altogether, and 2 other regiments make the 90. Of those intended for seacoast fortifications none have been delivered, but 7 seven are in process of construction.

Mr. SMITH. I believe you told us last year, if I remember correctly, that the line of the Army was then supplied with these guns, did you not?

General CROZIER. I told you that the number necessary for supply of the line of the Army was about completed.

Mr. SMITH. I may be in error about this, General, but I was of the impression that you told us last year that the regiments of the Regular Army were supplied with these guns.

General CROZIER. I may have told you that we had enough to supply them. The scheme was not quite ready, but we had them.

Mr. SMITH. So that you now have more than half enough contracted for for the seacoast fortifications?

General CROZIER. Yes, sir.

Mr. SMITH. And you have enough delivered for the Regular Army, so that whatever additional appropriation is given here is to make out the equipment for the militia, and an additional number of about 90 for the seacoast fortifications. Is that correct?

General CROZIER. Yes; but for reserve.

Mr. SMITH. I treated the militia as a reserve, but of course the Regular Army might be enlarged in time of war.

General CROZIER. The reserve would contemplate a much larger force than the militia, which is a little over 100,000.

Mr. BRUNDIDGE. How many of these guns did you say you have, all told, now? I understood you to say that you ultimately expected to get 935.

General CROZIER. We have 90 actually delivered, and 137 under contract under manufacture, making 227 provided for to-day; that is, 227 either built or building. There are more still provided for which I will get out of this balance of $46,000 and which I have not yet allotted.

Mr. SMITH. About how many will that provide for?

General CROZIER. It depends upon how I can spend the money. The reason why I have delayed allotting that money, and getting that manufacture under way, is because I have not been able to determine whether I had better get these appliances—for instance, the shields—at the Rock Island Arsenal or get them under contract. If I make them at the Rock Island Arsenal, they will cost something like half what I shall have to pay for them if I get them under contract. In that case I shall have more of this $46,000 left. I shall decide it in a short time.

Mr. SMITH. About how many guns will the $46,000 buy?

General CROZIER. Providing I spend it all for guns and what goes with them completely—that is, the necessary pack outfit, shields, and everything of that kind—about $3,000 apiece.

TREASURY BALANCES.

Mr. SMITH. Now we pass to the next item, and I will ask you to give us the Treasury available balance.

General CROZIER. The Treasury balance is $1,083,956.32.

Mr SMITH. What is the available balance?

General CROZIER. Seventy-six thousand dollars.

Mr. SMITH. What is the amount of this difference between the Treasury balance and the available balance, and what is the amount which is allotted for work in the arsenals?

General CROZIER. It is pretty hard to answer that without looking at the books.

Mr. SMITH. In our desire to be expeditious in this we will ask you to have prepared as speedily as possible a statement of the available balances, the Treasury balances, and the amount of the difference that is contracted for and the amount that is allotted to arsenals, and furnish it to us in tabulated form.

General CROZIER. Very well.

General KEIFER. Is the available balance that you give in these statements the same as the unallotted balance?

General CROZIER. Yes, sir.

Mr. SMITH. Those words are used interchangeably, and have been heretofore.

Statement of accounts under the appropriations "Armament of fortifications" and "Fortifications in insular possessions," December 3, 1906.

For the purchase, manufacture, and test of machine automatic guns, including their carriages, sights, etc.:

"ARMAMENT OF FORTIFICATIONS—A."

Balance in Treasury		$257,503.27
Due under contracts	$205,079.61	
Due to arsenals	6,531.02	
Balance unallotted	45,892.64	
		257,503.27

For the manufacture and test of mountain, field, and siege cannon, including their carriages, sights, etc.:

"ARMAMENT OF FORTIFICATIONS—B."

Balance in Treasury		$1,083,956.52
Due under contracts	$767,280.66	
Due to arsenals	242,083.13	
Balance unallotted	74,592.73	
		1,083,956.52

For the purchase, manufacture, and test of ammunition for machine and automatic guns and for mountain, field, and siege cannon, etc.:

"ARMAMENT OF FORTIFICATIONS—C."

Balance in Treasury		$225,433.15
Due under contracts	$51,279,36	
Due to arsenals	129,208.68	
Balance unallotted	44,945.11	
		225,433.15

For the purchase, manufacture, test, and issue of rapid-fire guns for coast defense, including their carriage, sights, etc.:

"ARMAMENT OF FORTIFICATIONS—D."

Balance in Treasury		$198,146.17
Due under contracts	$142,155.58	
Due to arsenals	53,120.41	
Balance unallotted	2,870.18	
		198,146.17

For the purchase, manufacture, test, and issue of ammunition for rapid-fire guns for coast defense, etc.:

"ARMAMENT OF FORTIFICATIONS—E."

Balance in Treasury		$9,848.08
Due under contracts	$9,725.90	
Balance unallotted	122.18	
		9,848.08

For the purchase, manufacture, test, and issue of seacoast guns and their mounts, including sights, etc.:

"ARMAMENT OF FORTIFICATIONS—F."

Balance in Treasury		$40,481.03
Due under contracts	$735.00	
Due to arsenals	18,966.30	
Balance unallotted	20,779.73	
		40,481.03

For the purchase, manufacture, and test of seacoast cannon for coast defense, including their carriages, sights, etc.:

"ARMAMENT OF FORTIFICATIONS—DFG."

Balance in Treasury		$498,544.38
Due under contracts	$262,837.85	
Due to arsenals	190,566.95	
Balance unallotted	45,139.58	
		498,544.38

For the purchase, manufacture, and test of ammunition for seacoast cannon, etc.:

"ARMAMENT OF FORTIFICATIONS—H."

Balance in Treasury		$473,802.30
Due under contracts	$351,310.08	
Due to arsenals	76,588.83	
Balance unallotted	45,903.39	
		473,802.30

For the purchase, manufacture, and test of inspecting instruments, * * * range finders, and other instruments for fire control in field batteries, etc.:

"ARMAMENT OF FORTIFICATIONS—I."

Balance in Treasury		$131,311.64
Due under contracts	$1,894.53	
Due to arsenals	41,382.45	
Balance unallotted	88,034.66	
		131,311.64

For the purchase, manufacture, and test of ammunition, subcaliber tubes, and other accessories for seacoast artillery practice, etc.:

"ARMAMENT OF FORTIFICATIONS—K."

Balance in Treasury		$479,208.96
Due under contracts	$238,100.96	
Due to arsenals	71,621.73	
Balance unallotted	169,486.27	
		479,208.96

For the alteration and maintenance of the mobile artillery, including the purchase and manufacture of machinery, etc.:

"ARMAMENT OF FORTIFICATIONS—L."

Balance in Treasury		$40,420.93
Due to arsenals	$10,254.28	
Balance unallotted	30,166.65	
		40,420.93

For the alteration and maintenance of the seacoast artillery, including the purchase and manufacture of machinery, tools, etc.:

"ARMAMENT OF FORTIFICATIONS—M."

Balance in Treasury		$693,400.42
Due under contracts	$12,827.50	
Due to arsenals	266,306.94	
Balance unallotted	414,265.98	
		693,400.42

For the purchase, manufacture, and test of ammunition, subcaliber tubes and other accessories for mountain, field, and siege artillery practice, etc.:

"ARMAMENT OF FORTIFICATIONS—N."

Balance in Treasury		$97,858.94
Due under contracts	$4,489.50	
Due to arsenals	40,105.25	
Balance unallotted	53,264.19	
		97,858.94

For the purchase and manufacture, test, and issue of rapid-fire guns for coast defense for the insular possessions, etc.:

"FORTIFICATIONS IN INSULAR POSSESSIONS—D."

Balance in Treasury		$96,767.90
Due under contracts	$92,658.43	
Reserved to pay royalty	4,000.00	
Balance allotted	109.47	
		96,767.90

For the purchase, manufacture, test, and issue for the insular possessions of seacoast guns and their mounts, including sights, etc.:

"FORTIFICATIONS IN INSULAR POSSESSIONS—F."

Balance in treasury		$43,593.37
Due Watertown arsenal	$40,566.21	
Balance unallotted	3,027.16	
		43,593.37

For the purchase, manufacture, test, and issue for the insular possessions of seacoast mortars with their mounts, including sights, etc.:

"FORTIFICATIONS IN INSULAR POSSESSIONS—G."

Balance in treasury		$23,410.11
Due Watertown arsenal	$16,000.00	
Balance unallotted	7,410.11	
		23,410.11

For the purchase, manufacture, and test of seacoast cannon for coast defense for the insular possessions, including their carriages, etc.:

"FORTIFICATIONS IN INSULAR POSSESSIONS—DFG."

Balance in treasury		$468,527.40
Due under contracts	$146,729.33	
Due to arsenals	216,837.04	
Balance unallotted	104,961.03	
		468,527.40

For the purchase, manufacture, and test of ammunition for seacoast cannon for the insular possessions, etc.:

"FORTIFICATIONS IN INSULAR POSSESSIONS—H."

Balance in Treasury		$144,025
Due under contracts	$139,642	
Balance unallotted	4,383	
		144,025

For the purchase, manufacture, and test of inspecting instruments * * * range finders, etc., at the fortifications in insular possessions:

"FORTIFICATIONS IN INSULAR POSSESSIONS—I."

In Treasury and unallotted	$38,402.80

For the alteration and maintenance of the seacoast artillery in the insular possessions, etc.:

"FORTIFICATIONS IN INSULAR POSSESSIONS—M."

In Treasury and unallotted	$5,000

FIRE-CONTROL STATIONS.

Before we go any further, am I correct in my recollection that you have to do with the fire-control station, General?

General CROZIER. I supply the instruments for them. The engineers construct them, the Signal Corps arranges the communications between them and to the batteries, and the artillery operates them.

Mr. SMITH. That takes us back for a moment to page 2. No separate appropriation is made for your branch of the service on fire control?

General CROZIER. Not for the Seacoast Artillery this year, only for the Field Artillery.

Mr. SMITH. Whatever you obtain for seacoast purposes you obtain out of this item at the bottom of page 2, do you not?

General CROZIER. Yes, sir.

Mr. SMITH. Which is apportioned by the Secretary of War to the various branches of the service that are concerned in the estimate for fire control?

General CROZIER. Yes, sir.

Mr. SMITH. Divided between the engineers, the Signal Corps, and the Ordnance?

General CROZIER. Yes, sir.

Mr. SMITH. How much of the portion that has been allotted to the Ordnance out of all prior appropriations remains in the Treasury under this head?

General CROZIER. We never had any allotments from that until this last year. That has been made within the last two months. The amount allotted was $158,000, of which there remains on hand $150,261.08.

Mr. SMITH. What I wanted to know was what your Treasury balance was on your part of the fire-control system and what your available balance was from all these appropriations, whether made jointly or separately.

General CROZIER. The total available balance would be $246,600.

Mr. SMITH. The Treasury balance.

General CROZIER. The Treasury balance is $131,311.64.

Mr. SMITH. With the $150,000 added it would make it about $281,000.

Mr. GRAFF. And the available balance is $246,600?

General CROZIER. That is unallotted.

Mr. SMITH. Whose work is done first in the establishment of one of these fire-control systems at a seacoast fortification, the engineers?

General CROZIER. There is no reason why the engineer work and our work should not go on concurrently, because they can build these stations and we can have the instruments under construction for them at the same time. The putting in of the wiring, the work of the Signal Corps, would be done after the stations were completed.

Mr. SMITH. If I remember rightly, you told us last year that these stations were now designed by the artillery. They stated what they wanted from the study of the subject, and then the stations were constructed substantially in accordance with their wishes in the matter?

General CROZIER. Yes.

Mr. SMITH. In how many places would you say the permanent fire-control system was now established?

Major FULLER. It is not entirely completed, but we have the money, so far as the Ordnance Department is concerned, for four harbors—Boston, New York, Portland, and Puget Sound. This $158,000, which was given us from the fire-control fortifications appropriation, was for the purpose of clearing up these four harbors.

Mr. SMITH. If I understood the evidence a year ago, it showed that while only a few of the harbors were approximately completely

equipped with permanent establishment, substantially all of the harbors were equipped with the temporary fire-control establishment. Is that correct?

General CROZIER. I think that is nearly correct; yes, sir.

Mr. SMITH. In other words, they will have overhead wires and temporary houses and buildings in place of the permanent ones as finally agreed upon as the proper standard and design.

General CROZIER. In most cases the instruments, too.

Mr. SMITH. Of course, this whole system is very new, and, as I understand it, there has been no place completed more than a little over a year.

General CROZIER. No; there has not; and they drill with this system and ought to have something to drill with.

General KEIFER. You do not regard it as valuable in time of great necessity, do you? I refer to these temporary arrangements.

General CROZIER. It is vulnerable. In the first place, many of their stations and their communicating wires are completely exposed and would be subject to interruption.

Mr. SMITH. Do you mean that it is absolutely worthless in time of war?

General CROZIER. I do not mean that at all, because it is not absolutely worthless.

Mr. BRUNDIDGE. How many of these are finally completed now?

General CROZIER. I believe they call New York Harbor completed, and that is the only one.

Mr. BRUNDIDGE. You say you "believe" it is completed.

General CROZIER. Mr. Brundidge, it is rarely that we get anything completed so that we do not have anything more to do on it. It is completed in that we could use it efficiently to-day against an enemy if they came in, and it would not be subject and admissable to harm, suspension, disaster, and interruption.

Mr. BRUNDIDGE. What I meant was this: In view of the fact that when this matter was first discussed here there was such a variance as to the estimated cost, I simply wanted to know as to the matter of actual cost after completion, and also if you have reached the point where you can ascertain what that would be.

General CROZIER. There is an estimate of what the entire cost of completion will be.

Mr. BRUNDIDGE. That is what I wanted to know, if you had completed one so as to know what it would cost.

General KEIFER. Will the cost of each place be the same?

General CROZIER. No, sir; it will not be. The distances between stations will be different, requiring a different amount of wiring. The number of guns mounted is quite different, and the number of instruments in one harbor may be quite different from another. All of the elements are likely to be different.

General KEIFER. Then no two of them will cost the same?

General CROZIER. Probably not; but we ought, from the cost of any one rather expensive system like New York, to get a line on the cost of the others, and a very good one.

GUNS AND CARRIAGES.

General CROZIER. Do you care to have me state how we stand as to the guns to be provided under the appropriations that have been made, and the total number that we expect to get?

Mr. SMITH. I think the committee would be glad to go into that.

General CROZIER. Briefly I will say that the total number of guns and carriages that have been provided for thus far are 336. We hope eventually to supply a thousand, and the rate at which the estimates that I am submitting to you now would permit them to be procured would give us this supply in 1919.

Mr. SMITH. What size army would these thousand guns be estimated for?

General CROZIER. A very conservative estimate of the number of guns corresponding to the troops of a mobile army would be two guns for every thousand men. That is quite conservative. An army of 500,000 men would then call for the thousand guns which I speak of.

General KEIFER. You did not want to have us understand that they are assigned two to each regiment?

General CROZIER. No, sir.

General KEIFER. But they are assigned on the basis of having that many to the number of troops you mention?

General CROZIER. Yes, sir.

Mr. SMITH. Can you give the committee any information as to the number of field guns that are probably held by the chief governments of the world, if you have any information on that subject?

General CROZIER. That is very carefully guarded, and I do not think I can give you any information. I can say this, that the policy and the practice of all of those Governments which maintain considerable armies is different from ours in the manner of the providing of field artillery, in that when they adopt a new model they give large orders and get their supply in the shortest possible time, and then cease giving the orders. They do not spread the procurement of supply over such a term of years as we do. We had an illustration of that quite recently in the case of the British Government. They have adopted a new field artillery consisting of two classes of guns, one 18 pounder and one 13 pounder, and they have given large orders for those guns, both to the Government and private establishments who make that class of material in Great Britain. I understand they are contemplating getting their supply within a short time. I am speaking entirely from memory, you will understand. But something over a year ago the statement was published on such authority that I think it is true, that they had given an order then for a thousand of those guns.

Mr. SMITH. As a matter of fact, a thousand guns is quite a large artillery equipment, according to all past wars, is it not?

General CROZIER. Yes, sir.

Mr. SMITH. I believe, if I recollect right, that they had 1,200 in the Russian war, and I think probably that was the largest number used up to that time.

General CROZIER. I should think so.

General KEIFER. I would like to know if the tendency in the last thirty years has not been to increase the proportion of artillery to infantry and cavalry?

General CROZIER. In the Franco-Prussian war there existed that tendency. Since this last war in Manchuria artillery stock has also gone up a good deal, and I think I can say that the relative value

assigned to artillery is higher than before; that the artillery is considered a more valuable branch of the service.

Mr. SMITH. Due to fire control?

General CROZIER. Yes, sir. For many years the artillery has exceeded in power and range the infantry. Of course, the weapon is much more powerful and has a greater range.

General KEIFER. One reason for increasing the relative amount of artillery after the Franco-Prussian war was that in that war the artillery was used more largely than in any previous war.

General CROZIER. Yes; and early in the engagements; pushed out farther to the front.

Mr. BRUNDIDGE. I understood you to say that you had 336 of those guns?

General CROZIER. Built or building.

Mr. BRUNDIDGE. In speaking of the other governments, you mentioned their orders for such large quantities. Do you think that is the wise policy?

General CROZIER. If one were living in a state of acute realization of the possibility of war, I should think it would be.

Mr. BRUNDIDGE. But I mean what changes and improvements are being made on those guns here or have been made recently?

Mr. SMITH. As I understand it, these guns are brand new—that is, within two or three years.

General CROZIER. Yes, sir; the new field gun.

Mr. BRUNDIDGE. You have 336 of the new guns.

General CROZIER. Yes. We do not wish to change any now.

Mr. SMITH. This gun is the recoiling gun?

General CROZIER. Nearly 4 feet; yes, sir.

Mr. SMITH. That, I suppose, is the real reason, the fact that this is an entirely new pattern, that such a large appropriation is needed or is estimated for?

General CROZIER. Yes, sir. But I call your attention to the fact that 1919 is a very conservative date for the completion of this very conservative supply.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR MACHINE AND AUTOMATIC GUNS.

Mr. SMITH. "For the purchase, manufacture, and test of ammunition for machine and automatic guns." The language of this item has never been entirely plain; and will you state, for the purpose of getting it in the hearings, whether this is the reserve ammunition or in condition to be used in practice?

General CROZIER. This is reserve ammunition, not to be used in practice. It is to be stored away for use in war, excepting that part of it that has to be used currently in procuring ammunition itself and in testing guns. But it is not for the current practice of the artillery.

Mr. SMITH. If I understood you correctly a year ago, you stated that while this was ammunition for reserve, in order to keep fresh ammunition for reserve it was common to transfer this ammunition to practice ammunition, and then credit this fund with the amount of the value of that ammunition from the appropriation for practice purposes. Is that correct?

General CROZIER. That is substantially correct. The statement can be made, I think, in another way—that we issue the oldest ammunition on hand for practice always.

Mr. SMITH. Then, in order to replace that, you use the money that is appropriated for practice in putting new ammunition into the reserve.

General CROZIER. Exactly.

Mr. SMITH. On what basis is this appropriation of $250,000 asked with reference to when the reserve which you deem necessary would be complete for the thousand guns and the 900 automatic guns?

General CROZIER. We intend to have enough ammunition for the field and siege artillery to fill all the ammunition chests of the batteries, and the amount which I have estimated here, taken in connection with the amount already on hand, will give a sufficient quantity of field and siege ammunition to fill the chests of that class of artillery 82 per cent full—that is, 82 per cent for the guns that have been provided for up to and including the appropriation bill for the fiscal year 1907. That is about the way it stands now. But we should have these estimates run along so as to get the ammunition to completely fill these chests at about the time we get the battery ammunition, in 1919.

Mr. SMITH. But it would be more than two years before you would have the guns themselves that have been heretofore appropriated for, or about that.

General CROZIER. From the present time?

Mr. SMITH. Yes, sir

General CROZIER. That is to say, it will take two years for us to complete the guns which we already have funds to complete?

Mr. SMITH. Yes; approximately.

General CROZIER. Those that are under manufacture now will all be completed in much less than two years—by June 30, I think.

Mr. SMITH. I will state the basis upon which I asked that question. I noticed last year that your Treasury balance was something over a million dollars, and you got $500,000, indicating that your expenditures—not your allotments, but your expenditures—were close to two years behind all the time under this item; that is, they were about equal to double the amount of the annual appropriation. And upon that basis I asked you the question whether it would not be approximately two years before you expended these sums.

General CROZIER. I think now that practically all of the difference between the Treasury balance and the available balance at the present day will be actually disbursed within a year.

Mr. SMITH. What is your basis of estimate for the ammunition for automatic guns?

General CROZIER. The sum that I have estimated will provide 3,000 rounds of reserve ammunition for each one of the 107 seacoast guns that are being procured, and 3,500 rounds for each of the 120 that are either on hand or are being procured for the infantry and cavalry.

Mr. SMITH. You speak of having enough ammunition for the chests of the field artillery. Where is that stored? It is not actually kept in the chests, of course. Where is the reserve stored?

General CROZIER. We issue to each of the field batteries of the regular service enough to fill their chests, but we have a good deal of

reserve artillery, of course, or we hope to have, and also we retain a part of that which will be issued to the militia in case of war—the organized militia. That is stored at the powder depot, at Dover, N. J.

DOVER, N. J., POWDER DEPOT—STORAGE FACILITIES.

Mr. SMITH. What are the warehouse facilities, so to speak, at Dover for caring for that? Does it involve the construction of new places for storage at any time in the near future?

General CROZIER. We have very considerable storage facilities at Dover now; they have been under construction for a term of years. And although the magazines are not completed the programme of new construction is a modest one.

Mr. SMITH. For how many years would the present plan of construction of magazines there keep this reserve—that is, how many years would it be that we would go on appropriating $250,000 a year for reserve ammunition before it involves a reconstruction of the magazines for storage purposes?

General CROZIER. We are carrying the programme of construction of magazines along so as to keep the storage room ahead of the appropriation for ammunition. It is considerably ahead now, and we hope no reconstruction will be necessary. We are enlarging storage facilities all the time, but thus far the storage facilities are ahead.

PURCHASE, MANUFACTURE, AND TEST OF SEACOAST CANNON FOR COAST DEFENSE, ETC.

Mr. SMITH. I never did like the language of this item at the bottom of page 9, in view of the purpose for which the appropriation is sought:

For the purchase, manufacture, and test of seacoast cannon for coast defense, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at arsenals.

General CROZIER. That language was changed about three years ago.

Mr. SMITH. The purpose of the appropriation has been changed since that. This is the language under which the money was appropriated for the acquisition of these guns under the large contract that you had for new guns.

General CROZIER. That contract is already finished.

Mr. SMITH. But this was the language that was used to carry the appropriation under that contract and for the manufacture of the guns.

General CROZIER. That was a separate appropriation by itself.

Mr. SMITH. Now, you state here that it is "Estimated to procure improvement in breech mechanisms of seacoast guns; relining seacoast guns; necessary machinery and tools for use in the manufacture, etc." I believe you stated a year ago that it was proposed to refit some of these guns with new breech mechanisms, that they had never been in use or mounted, and it was therefore a change of design before mounting.

General CROZIER. I think that was assuming that the change was much more complete than it is here. We are not fitting them with

new breech mechanisms. We are making improvements in the breech mechanisms which will add to its safety, but we are not throwing away that old mechanism.

Mr. SMITH. This language does not, any of it, bear the construction of being intended to carry the appropriation for remodeling, relining, or the like. It is "For the purchase, manufacture, and test of seacoast cannon for coast defense;" and under that you substantially propose to do nothing except to modify the breech mechanism, to reline the guns, and the like. Is that suitable language, in your judgment, for that purpose?

General CROZIER. I think I said last year that these guns of which we intended to improve the breech mechanism were new guns not yet issued in the service, and therefore we considered that they were not yet completed.

Mr. SMITH. That is what I referred to in my question a moment ago. But under what language here do you cover relining?

General CROZIER. I think that the language is properly subject to that criticism. The relining is not well covered by it. I contemplate, however, expending about $50,000 in relining of seacoast guns of this amount that I have estimated for here. There is another item that perhaps would cover that better, and I would be perfectly willing to have the amount transferred from one to the other and have it understood that this appropriation would not be used for that purpose.

General KEIFER. It would be easy to put a few words in that clause preceding and provide for it there.

General CROZIER. Yes, sir; unless it would be considered better to cover it in this other clause, which reads as follows—we will come to it after a while, and I might as well read it now:

ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY.

For the alteration and maintenance of the seacoast artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work and the expenses of the mechanics engaged thereon.

Mr. GRAFF. That is on page 13, I guess.

General CROZIER. This would cover the alteration of breech mechanism exactly. I considered that it would apply to the artillery already in the service, but it would also cover that which has not been, perhaps.

Mr. SMITH. When this matter came up, my first impression was that the relining of a gun is in the nature of remodeling the gun. Is it not?

General CROZIER. Relining the gun is in the nature of repair. We reline guns because the bores wear out. By putting in a new lining we have practically a new gun.

Mr. SMITH. That was experimental a year ago?

General CROZIER. Yes, sir; we lined one or two, and it was a decided success. We have not had the money necessary to reline others.

Mr. KEIFER. Turn to the bottom of page 9, to the item "For the purchase, manufacture, and test of seacoast cannon for coast defense." If we put in relining there, it would be for seacoast cannon.

General CROZIER. You might say "For the purchase, manufacture, and repair," etc. How would that do?

Mr. BRUNDIDGE. That would be alteration.

Mr. KEIFER. It is not an alteration in fact. It is a restoration.

General CROZIER. The relining is.

Mr. KEIFER. The word "repair" would cover a multitude of sins?

General CROZIER. Yes, sir.

Mr. SMITH. Let us make a note of that in our books and take it up when we come to it. You notice the other language is "maintenance." I do not know how broad "maintenance" is.

General CROZIER. That might include maintenance and repair. I would be very glad to shift all that work over to that item, and in that case the estimate could be reduced to $30,000. You can shift it over as you like. This is intended to cover one 14-inch gun with its carriage complete, $132,000; for relining seacoast guns, $15,000; for improvements in the breech mechanisms of seacoast guns, $22,000, and for machinery and tools used in manufacture, $10,000.

Mr. SMITH. What do you want with a 14-inch gun, General?

General CROZIER. There is a little story about that, Mr. Chairman. I will have to ask you to be a little patient, so that I can explain it in full. When the Endicott board of 1886 made its report, it recommended for the defense of the coast 16-inch guns, 14-inch guns, 12-inch guns, and guns of smaller caliber. As we went along improvements in gun construction, and particularly improvements in powder, enabled us to so increase the power of our guns that we arrived at a stage where we considered the power of the 12-inch guns sufficient for use against any battle ship that we would have to encounter, and the construction of the 14-inch and 16-inch guns was abandoned.

This involved an increase of the length and the weight and the cost of the 12-inch gun and a very large increase in the charge of powder; the result we got was a very large increase of velocity, going from about 2,000 feet per second from the date of the Endicott board to about 2,500 or 2,600 feet velocity for the projectile weighing 1,000 pounds of more recent times. However, when we came to use the guns, or rather to try them at the proving grounds, under these new conditions it was found that these very large charges of powder so washed away the metal of the bore that in 60 or 70 rounds the rifling would be obliterated for a considerable distance, and the projectiles would no longer be given the rotary motion necessary for accuracy, and the guns would have to be relined.

This only happened with one or two of the guns at the proving grounds, where we expect to wear things out in trying them. The guns mounted in the seacoast fortifications have not been fired any such number of rounds as that, and therefore this process of wearing and deterioration has scarcely commenced with them. It is evident, with such a short life as that, that the necessity for relining the guns would entail not only a considerable expense, but would place us in a situation where, at the beginning of an action, we would have partially worn guns that would become inaccurate before the action was over. One hour's firing with such a gun would so impair its accuracy that it would be to a degree inefficient, even if it were new when the action commenced. That situation required to be met.

By reducing the charge of powder in these high-power 12-inch guns so as to bring the velocity of a projectile down from 2,500 feet

to about 2,250 feet we prolonged the life of the gun three or four hundred per cent. The price that we pay for it is that we so diminish the power of the gun that the range at which the projectile will penetrate the thickest armor is reduced from 8,000 yards to 6,000 yards; and to that extent these guns of the highest power we have thus far built are not as good as we hoped for.

We have got to use them at this lower power, where they are not good for the same degree of penetration and will not be effective at as long a range. Now, to get back that necessary power we propose going to a 14-inch gun and putting the 14-inch gun in place of the 12-inch gun in those places where the latter have not yet been installed; and where we were contemplating installing these higher power 12-inch guns we will build 14-inch guns for a velocity of 2,150 feet a second only, and by reducing the velocity we bring the charge of powder down not only proportionately, but actually to 100 pounds less weight than is required in this high-powered 12-inch gun. Also, by not calling upon the gun for so high a velocity, we are enabled to shorten it; and by not using as large a charge of powder we reduce the diameter of the chamber, and consequently the thickness of the chamber at the breech, so that the gun is not only proportionately lighter, but actually lighter. Being lighter, it is cheaper and does not cost as much as the high-velocity 12-inch gun. On account of the greater weight of projectile, which will be about 1,600 pounds as against 1,000 pounds for the 12-inch gun, the gun would be able to strike a harder blow at a short distance from the muzzle than the 12-inch gun, and the heavier projectile flies better, not only on account of its increased weight, but also because the lower velocity involves a lesser resistance of the air. At every 100 yards beyond the muzzle it will strike a blow proportionately still harder than the other, so that it involves an increase in efficiency and lightness and diminution in expense.

Now, there is one way in which we pay for that. Because of the lower velocity the trajectory of this projectile—that is, the path it describes through the air—is more curved, and therefore what we call the danger space is made smaller. We assume a target 24 feet high from the water line up in a ship we aim at. You can see, if the projectile is designed to take a certain angle, it would strike that target, whether it would strike the water directly at the water line, or, if allowed to go unimpeded, it would strike a certain distance beyond the target. Now, that horizontal distance within which the striking of the projectile would involve the hitting of this 24-foot vertical target is called the " danger space," and you can see that, in order to hit this target, the range must be determined to a degree of accuracy represented by half this " danger space." Now, if the target is half the " danger space " closer or half the " danger space " farther away and if the projectile is aimed to strike the target in the middle it will still strike it somewhere.

Mr. KEIFER. Assuming that the projectile is passing on a horizontal line, it will be more apt to strike?

General CROZIER. Yes, sir.

Mr. KEIFER. The trajectory is greater with the larger gun?

General CROZIER. Yes. The angle of the fall with the larger is greater than with the smaller. The difference is such that at about 6,000 yards the " danger space " of a projectile of this 14-inch gun

would be about 75 per cent of that of the 12-inch gun; but by means of the accurate fire-control and the range-finding instruments that we have in our seacoast fortifications, and because we have a perfectly stable platform and accurate methods of determining the range, which are like the methods of surveying and very precise, we consider that we can strike the target, notwithstanding this reduction in the "danger space."

STATUS OF THE 16-INCH GUN.

Mr. SMITH. Now, General, you have one 16-inch gun. Is it mounted yet?

General CROZIER. I will just add one word more to that other explanation before answering that. By this process of using the 14-inch gun at a lower velocity the life of the gun is prolonged to four times as many rounds as provided in the higher velocity gun.

Mr. SMITH. You have one 16-inch gun?

General CROZIER. Yes.

Mr. SMITH. Have you mounted it yet?

General CROZIER. Not yet.

Mr. SMITH. Have you any method of firing these heavy guns at the proving grounds before they are mounted, for the purpose of testing them?

General CROZIER. We test ultimately, practically to destruction, one gun of each type. The destruction now usually involves the wearing out of the bore. Then with a smaller number of rounds we prove every individual gun—that is, we used to do that with each gun at the proving ground, and would send it to the proving ground before sending it to the fortification. Latterly, however, since the guns are so uniformly successful in enduring the proof, we have been sending them directly to the fortifications.

Mr. SMITH. Has this 16-inch gun ever been fired off?

General CROZIER. Oh, yes.

Mr. SMITH. You got the money last year with which to mount that gun. It is not mounted?

General CROZIER. No, sir; it is not. Would you like to know why, Mr. Chairman?

Mr. SMITH. Of course, if you wish to tell us why, we would be glad to know.

General CROZIER. I am very willing to tell you why. We can see an improvement in the service type of disappearing carriage upon which we intend to mount that gun; no radical change from the one we contemplated when we commenced making that type, but we think it will be made with a little less trouble than the present form of disappearing carriage. We were constructing a type of disappearing carriage for the 16-inch gun, the same as the gun for which we make that type of carriage, but we did not think it safe to embody the change in this carriage, in the larger carriage, until we did it in a carriage of a smaller caliber gun. The first 6-inch carriage embodying this change was considerably delayed in its construction, but it is now on its way to the proving ground—either on its way or in process of erection. When that test shows that it is a real improvement we will go on with the construction of this 16-inch carriage and perfect the preparation of the plans and drawings. The plans and drawings are about perfected. That is the reason we have not mounted that

gun yet. There is no battery ready for it, also, but that involves no delay on the part of the Engineering Department, because they can build the battery while we are building the carriage.

Mr. SMITH. Is it not a fact that the Navy, after trying the 13-inch gun, has abandoned it entirely in favor of the 12-inch gun?

General CROZIER. Yes, sir.

Mr. SMITH. Are any nations using the 13-inch gun or 16-inch?

General CROZIER. There are some such guns in existence, which had been mounted on the seacoast and on vessels of older type.

Mr. SMITH. If you had one 16-inch gun mounted, would it not throw light on this theory as to the advantage of a larger caliber gun?

General CROZIER. That 16-inch gun was designed as a high-power, high-velocity gun, like the 12-inch gun. In order to illustrate this idea which I have just been advancing in connection with the 14-inch gun, we would have to use that gun at a lower velocity than that which it was designed for, which we would probably do. If, in accordance with that plan, we would fire it to destruction and see how many rounds would be required to wear it out, it would illustrate——

Mr. SMITH. Would not that be the best thing you could do with the 16-inch gun?

General CROZIER. We would then simply have to ask you for an appropriation for relining it.

Mr. KEIFER. Do you not figure about 5 miles, General, as the distance at which you can fire accurately?

General CROZIER. We can fire 5 miles pretty accurately from shore.

Mr. SMITH. Let me ask you this question: Do I understand that the naval guns of 13-inch caliber are high-velocity guns?

General CROZIER. Not so high as the 12-inch guns which followed them.

Mr. SMITH. What is your reason for believing that their experiments with greater caliber guns will not be fruitful of information on the subject, and that the larger caliber guns are not a success?

General CROZIER. It comes down to this point, which I mentioned about the "danger space:" In a naval engagement a vessel can not estimate the range with accuracy; they can not use our appliances for that purpose; they can not have our base lines; and therefore their range is a good deal of a guess. Their platform is rolling, and they have to discharge their guns on the fly, as it were, very much like wing shooting, which also interferes very seriously with the accuracy of firing, and a change that tends to diminish the probability of hitting to the extent that would be involved by the reduction of the "danger space" by about 25 per cent is regarded by the Navy as inadmissible.

Mr. SMITH. Would not their experience with reference to the penetrating power of large-caliber guns and small-caliber guns be just as reliable as it would be upon land?

General CROZIER. There is no question as to that. There is no question in the minds of anybody in the Navy or in the Army but that this 14-inch gun will strike a harder blow and be more destructive than a 12-inch gun.

Mr. SMITH. Even with its less velocity?

General CROZIER. Yes; even with its less velocity. That is not in dispute. In fact, there is no point in dispute between the Army and Navy as to that, and they simply say that the probability of hitting is so valuable an element that they can not afford to diminish it, and as they have not got our accurate methods of firing, and can not have them, they must not make that sacrifice. There is also only one other point: The projectile, being 60 per cent heavier for these 14-inch guns than for the 12-inch guns, of course a smaller number of rounds could be carried in a vessel which is limited in the matter of weight or capacity.

Mr. GRAFF. After all, this item, Judge, is principally composed of this 14-inch gun?

Mr. SMITH. Yes.

Mr. GRAFF. The question of changing the language is not very important in view of that.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR SEACOAST CANNON.

Mr. SMITH. We are now down to page 10, to the second item. I guess, unless there is something further we want to ask about that other item, we will go to the next, "For the purchase, manufacture, and test of ammunition for seacoast cannon, including the necessary experiments in connection therewith, and the machinery necessary for its manufacture at the arsenals."

General CROZIER. I think the amount is $500,000. That includes powder, high explosives, projectiles; also some work of alteration on projectiles, putting caps on the points to increase the penetration, which some of the earlier ones we purchased did not have; fuses, cartridge cases, storage cases to store the cartridges in, where they will be hermetically sealed; the cost of inspection and tests of the ammunition as it is purchased, and the reserve supply of sodium nitrate, from the supply of which we will be cut off in time of war.

Mr. SMITH. How much of this, in a general way, do you expend in the manufacture of powder? In other words, are you devoting the money you get under this item to the purchase of projectiles and sodium nitrate that would either be unobtainable in time of war or slow of production in time of war, or are you devoting it to a considerable degree to the manufacture of powder, which could probably be done in time of war?

General CROZIER. We are devoting a considerable amount of it to the manufacture of powder. But it must be remembered that it takes six months to manufacture a pound of this powder, the reason being that it takes most of that time for it to dry. The volatiles dry out of it very slowly. The powder is a solution of gun cotton in a mixture of alcohol and ether, which makes a kind of glue out of it, or gelatin, a gelatinous mass, and the volatile elements dry out of it, and it takes six months to do that. Of this amount of $500,000 which I have asked for on this bill about $207,000 is for powder.

Mr. SMITH. Does that include the constituent parts of powder, or the manufacture of powder alone?

General CROZIER. That includes the manufacture of powder alone. For the reserve supply of sodium nitrate, from which, I say, we would be cut off in time of war, and which comes from Chile, I have

estimated $78,000. That would be put away in storehouses which are constructed for it.

Mr. KEIFER. Is it indestructible by age?

General CROZIER. Yes. It keeps indefinitely.

Mr. SMITH. What I do not quite clearly understand was whether the item of $207,000 for powder included the material for powder.

General CROZIER. Oh, yes; it includes the material. We have not yet made any powder ourselves, and we get the smokeless powders from the manufacturers.

Mr. SMITH. Do you furnish the niter, or do they furnish it?

General CROZIER. They furnish it.

Mr. SMITH. Do you furnish the alcohol?

General CROZIER. Yes; we furnished a little of it, but we are winding that up now. The reason for our having furnished it heretofore was because in that way no internal-revenue tax was paid on it. The manufacturer could not procure it at anything like the price we paid. If he had to pay the internal-revenue tax his price would necessarily have been higher.

Mr. SMITH. You now furnish nothing for the powder?

General CROZIER. No, sir. Heretofore we were responsible for the quality of the alcohol. Now we are not. The manufacturer has got to furnish good alcohol. That is all there is about it.

POWDER, DETERIORATION OF.

Mr. SMITH. Is the powder you buy subject to deterioration?

General CROZIER. We think not—that is, we think it is subject to very slight change. In the past smokeless powder has deteriorated. It has been considered that that was due largely to the powders not being pure; that the processes of manufacture were such that things that ought to have been eliminated were not eliminated, and the process of deterioration would go on for that reason. Now, the change that takes place usually in this powder is that perhaps some of the volatiles, a greater percentage of the volatiles, will be evaporated from it in the course of time, and therefore the powder would become more powerful.

Mr. KEIFER. You do not get what we used to call rifle powder?

General CROZIER. We do not get that to any extent, but we get a small quantity of it for what we call the priming charges of the smokeless powder. The smokeless powder, you know, is very hard to inflame, and therefore we have to put in a charge of the old black powder, and that ignites the other.

Mr. KEIFER. That is subject to deterioration?

General CROZIER. Yes; that is subject to deterioration; much more so than the smokeless powder. We get some black powder also for saluting powder, but it is a very cheap grade of powder.

AMMUNITION FOR SEACOAST CANNON, EXPENDITURES FOR, 1907.

Mr. KEIFER. Have you expended your allotment of $325,000 for this year, appropriated for 1907? Have you allotted that mainly in making provisions for purchases?

General CROZIER. That sheet of balances that I am going to send to you will tell that story. I will say in regard to this estimate

that it contemplates the supply of powder and projectiles for the reserve for war purposes, which we think we will come to in about the year 1930, so that you will see we are getting that slowly. Now, with reference to powder and projectiles——

Mr. SMITH. Pardon me, General, but right there, how is this apparent conflict in the estimate and in the bill itself? One contemplates 1922 and the other 1930. One estimate is by Colonel Russell and the other is by yourself. It seems to me, on the face of them, that they are not in harmony. I would like to have that explained.

General CROZIER. In preparing this year's estimate as to date when the reserve would be accumulated a larger number of guns had to be considered, and, since the last appropriation was for a much smaller sum than the estimate, a greater deficiency had to be taken into account.

It was considered advisable, also, to increase the amount estimated for fuses, base covers, etc., and for preparing projectiles on hand for base covers and capping them, and to correspondingly reduce the amount estimated for new projectiles, powder, and high explosives.

If this division were to be maintained hereafter, it would require until 1930 to accumulate the reserve of projectiles and powder, but the assumption that such would be the case was a clerical error. The correct date is 1927.

Since these estimates were prepared, however, it has been concluded to adopt a reserve sufficient for a two-hour action for half the guns now provided for.

In addition to this reserve, if war should become imminent, there would be an immediate demand for a large amount of ammunition for target practice. The Regular Army should expend one annual allowance in special practice, and all volunteer troops should expend twice this amount. On this basis it will require until 1921 to accumulate the reserve if $500,000 is appropriated annually.

Mr. SMITH. In order to keep the reserve clear, it would be much better to carry an appropriation for target practice and testing, and then one distinctly for reserve. It would be a more systematic way of arranging it to combine the target practice and testing under one item and then know just exactly what we have under reserve.

General CROZIER. The difficulty about that, Mr. Chairman, is this: The artillery people are naturally always striving for more target practice. They are always wanting to fire away more ammunition. I am not sure but that it is a good policy, if you can restrain it. If you have an appropriation that can not be exceeded, that limits it. Now, if you have that limit in with the supply of ammunition, part of which is intended for other purposes, the other purposes have a very strong force tending to make them suffer.

RESERVE SUPPLY OF AMMUNITION NOW ON HAND.

Mr. SMITH. That may be true, but under this system, if you know how much money you have in reserve ammunition—have you any way of telling?

General CROZIER. Yes. I have a table here showing every bit we have got.

Mr. SMITH. In its value?

General CROZIER. Yes; in its value. I will show it to you. It will take several tables to give you the necessary information. The table is headed, " Powder on hand and required for seacoast cannon." That is headed in columns in which the kind is indicated, smokeless powder and brown prismatic powder. The latter we use for mortars still. We do not throw it away, because it is useful for that purpose.

Mr. SMITH. You can fill the answer in when you come to go over your notes—the answer to the question I am now about to ask you. I will ask you to state, of the appropriations made " for the purchase, manufacture, and test of ammunition for seacoast cannon, including the necessary expenses in connection therewith and the machinery necessary for its manufacture at the arsenals," as near as you can, what portion is now invested in reserve ammunition, and what portion has been used for the testing of guns, or other purposes? Now, when you revise your notes you can insert those figures. We want to know how much we have got in reserve ammunition.

Mr. KEIFER. You do not mean to confine it to testing guns? You mean testing guns and target practice both?

Mr. SMITH. The target practice is not out of this appropriation, but I want him to state how much for testing of guns and other purposes.

General CROZIER. Of powder now on hand or under manufacture for this purpose I have about $3,200,000 worth. Of projectiles I have now on hand and under manufacture about $3,500,000 worth, in round numbers; and of high explosives, about $1,800,000 worth.

Mr. SMITH. Now, what have you got in the way of sodium nitrate reserve? Have you anything?

General CROZIER. I will have to look that up.

Major HORNEY. We have 21,800,000 pounds.

General CROZIER. It is something over 23 cents a pound.

Major HORNEY. It precedes the powder table.

Mr. SMITH. That is about $426,000 worth.

General CROZIER. I can tell you the rest of that sodium-nitrate story now. We propose to accumulate about 63,000,000 pounds, and the estimated cost of that is about one and one-half million dollars, and there has been provided for, as just stated, 21,800,000 pounds, and that amounts to about $500,000 worth.

Mr. GRAFF. About one-third of the amount which you think ought to be accumulated?

General CROZIER. Yes; almost exactly.

Mr. SMITH. These items constitute all the items of reserve powder, high explosives, and projectiles?

General CROZIER. Those are not quite all the items. We have also fuses. They are somewhat expensive. We have also powder boxes, which come under that item. We also have metallic cases in which to store this stock, so that it will be preserved. Then we have for the smaller classes of guns the brass cartridge cases. Of course if I attempt to give you all these items the amount of delay would cause the information to be lost.

Mr. SMITH. Have you cartridge cases for these small-size cartridges?

General CROZIER. Some of the larger size we have.

Mr. SMITH. Probably it would be safe to say that with these small

items of fuses and the like the amount of reserve exceeds nine and one-half millions?

General CROZIER. It would be more than that.

Mr. SMITH. We have no idea what these other items amount to—whether they amount to a hundred thousand dollars or a million.

General CROZIER. They do not run up to a million.

Mr. SMITH. What do you say it would amount to?

General CROZIER. The whole thing would amount to nine and one-half million dollars.

Mr. SMITH. So that practically $4,000,000 of this $13,000,000 that you have received has been devoted in these years to testing and other uses than reserve?

Major HORNEY. The early prices were very much higher on many of these articles. These are now carried at current prices, without reference to what they cost.

Mr. SMITH. So that we can not, even from this, form an estimate of what percentage of the appropriation has been going for testing and the like and what percentage has been going for reserve?

Major HORNEY. That would have to be searched out.

General CROZIER. We ought to be able to get nearer to that.

Mr. SMITH. What percentage of these items has gone to testing and other uses and what percentage to reserve?

General CROZIER. The percentage that has gone into testing and proving and experiments has heretofore been a high percentage, because the appropriations for the ammunition itself have not been large, and those things have cost just as much as they would have cost if the appropriations for ammunition had been much larger.

Mr. SMITH. We would like to know, at least, how much of all these numerous appropriations since 1891 have gone into reserve; and it would be well if, in the same connection, you would furnish us, say for the last fiscal year, or whatever year would be convenient for you to figure from, how much in dollars went into testing and experiments and how much into reserve, so that we can know from year to year how much goes to experiments and testing and how much to reserve. If you furnish that, I am satisfied it would be gratifying for the committee to know how much we are putting into reserve for any year in which we have given you a certain amount of money.

Amounts appropriated for ammunition for seacoast cannon.

Specific appropriations for fiscal years from 1891 to 1907, inclusive		$7,394,564.00
Allotted from national defense	$916,089.76	
Less amounts turned back into Treasury	166,402.64	
Balance expended		749,687.12
Armament of fortifications, No. 19a, from March 3, 1899, to March 3, 1903, for fuses and primes		195,500.00
Ammunition included in purchase of guns		743,557.42
		9,083,308.54
Accounted for as follows:		
Value of ammunition on hand		8,404,263.60
Miscellaneous expenditures [a]		633,141.55
Unallotted balance		45,903.39
		9,083,308.54

[a] Inspection, tests, armor plate, machines, tools, fixtures, experimental ammunition and experimental firings.

PURCHASE, MANUFACTURE, AND TEST OF INSPECTING INSTRUMENTS.

In the next item, on page 11 of the bill, I notice you have proposed to insert the words "at the fortifications and."

General CROZIER. Why is that put in?

Major FULLER. Our first estimate, as it went up to the Secretary, included fire control at fortifications.

General CROZIER. When we first made this estimate, it contemplated a larger appropriation, and a separate one for our own portion of the fire control of seacoast forts, and that was separated after all the estimates came before the Secretary's office, so as to make the lump appropriation in the first part of this bill.

Mr. KEIFER. You mean the words "fortifications and" might go out?

General CROZIER. Yes, sir.

Mr. SMITH. My impression is that, under the ruling of the House, the whole business has got to go out. In view of that fact I want to ask you how much of this estimate is for the purpose of purchasing, manufacturing, and testing and inspecting instruments for the manufacture and test of carriages and ammunition?

General CROZIER. Five thousand dollars for inspecting instruments.

Mr. SMITH. Suppose we strike out all as to range finders and other instruments for fire control under the assumption that all that is covered under the blanket appropriation and the rest is covered properly in the army bill. How much of your appropriation would remain in that case if the balance of the matter is covered by this item?

General CROZIER. I do not see anything but $5,000 that would remain in that case "for inspecting instruments, star gages, etc., $5,000." The idea is to separate the machinery for doing this work from the work itself?

Mr. SMITH. That is not my idea, but it seems to be the chairman's idea. My idea is to take it all.

General CROZIER. I have here a sum of $7,700, which is intended to cover machines, tools, inspecting instruments, and also the cost of inspection—the pay of inspectors, and that kind of thing.

Mr. SMITH. Suppose, to illustrate it, that we strike out of this the following language: "Range finders and other instruments of fire control at the fortifications and in field batteries," so that it would read: "For the purchase, manufacture, and test of inspecting instruments for the manufacture of cannon, carriages, and ammunition, and the machinery necessary for their manufacture at the arsenals," blank thousand dollars. How much would your estimate then be?

General CROZIER. About $6,500.

Mr. GRAFF. We still retain control of range finders at fortifications?

Mr. SMITH. Yes; but they are covered at fortifications in this large item in the early part of the bill which we took up this morning. This is solely for range finders in the mobile artillery, and we claim the right to appropriate yet for the machinery necessary to the manufacture of fire-control instruments.

Mr. KEIFER. Of all classes?

Mr. SMITH. Yes; of all classes. Under the ruling of the Chair we claim that we are entitled to appropriate for the manufacture of all machinery.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, SUBCALIBER TUBES, ETC., FOR ARTILLERY PRACTICE.

The next item is the practice item, for Seacoast Artillery. I see you have gratiously reduced your estimate to the amount which we gave you last year.

General CROZIER. Of course there is no method of saying precisely what amount of target practice is necessary to make people proficient. It is impossible to say that $300,000 worth will leave them entirely unfamiliar with their material, and that $400,000 will make them experts, capable of defeating the enemy. I believe that our artillery people are doing pretty well. They are doing very good shooting, and as I have that belief in their skill, acquired with the amount of practice permitted with the ammunition you have appropriated for, I have asked the same again.

Mr. SMITH. I do not want to ask you any embarrassing question as to the artillery, but if it would not be embarrassing, what would you say as to the shortage of enlistments in the artillery of 4,000 a few years ago? I do not know what it is now. What have you to say as to whether it affects the amount necessary for target practice?

General CROZIER. It is undoubtedly the case that when skilled men who have been trained leave the service and do not reenlist, and their places have to be supplied with green men who have to go through that training, the greater expenditures are necessary to bring them to the degree of skill of those who have gone.

Mr. SMITH. You have hardly caught my meaning. Up to a year ago they were unable to enlist up to within 4,000 of the men necessary for the artillery. The less number you have to train the less target practice there would be, would there not?

General CROZIER. That would not follow, from the way in which the target practice is prescribed. They have prescribed so many rounds for each company at the guns at which they are stationed, and they will fire that number of rounds of this ammunition for cannon, whether the company is full or whether it is short. Now, your question would receive a different answer if it related to the small-arms ammunition which is expended, because it is so much per man, and if the organization is short by a certain number of men, the amount expended will be less by a corresponding amount.

Mr. SMITH. The shortage, then, in the artillery branch is a shortage per regiment, and not a shortage in companies?

General CROZIER. Yes, sir.

Mr. KEIFER. In the infantry each man does his own firing, and he fires a certain number of shots?

General CROZIER. Yes, sir.

Mr. KEIFER. That is the reason it would be increased if you had a certain number?

General CROZIER. Yes, sir; but it is not so in the artillery.

Mr. SMITH. You have the full number of companies authorized in the artillery?

General CROZIER. Yes, sir.

Mr. SMITH. They seem to have acquiesced in the conclusion we reached last year, that $350,000 a year is enough.

Mr. KEIFER. That seems to be right.

ALTERATION AND MAINTENANCE OF MOBILE ARTILLERY.

Mr. SMITH. We will then pass to the item " For the alteration and maintenance of the mobile artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work and the expenses of the mechanics engaged thereon." Now, is this item for the estimated remodeling of the old field gun or is it on the new gun?

General CROZIER. The new gun altogether. It is intended only for the maintenance of that material in addition.

Mr. KEIFER. And this is the item which it is stated would include relining?

General CROZIER. That referred to seacoast artillery. This item refers only to field and siege artillery. It is for a different class of artillery. The seacoast artillery is on page 13.

Mr. KEIFER. I see. I thought he wanted to fix it in here.

Mr. SMITH. It is at the bottom of the next page. Now, this appropriation has gone up since 1904 from $8,000 a year to the estimate of $75,000 a year. What is the character of the work done under this? Are these guns being changed in any way or is it simply a repair fund?

General CROZIER. Thus far it is practically entirely a repair fund. Certain things have been shown by actual use of this material in the field to be not suitable. For instance, the wheels were all shown to be too light, and we are replacing those wheels, whether they have reached a stage of requiring repair or not.

Mr. SMITH. You only have about 90 of those guns, have you not?

General CROZIER. We have now 41 batteries built or building, of 4 guns each.

Mr. SMITH. How many of these mountain, field, and siege guns have you in use?

General CROZIER. We have 24 batteries of field material, 4 mountain and 2 siege. Then there is a quantity of 3.2-inch field material which must be put in order. It constitutes our reserve. Fifteen of these 3.2-inch batteries need attention.

Mr. SMITH. That is 60 guns, is it?

General CROZIER. Those are four-gun batteries.

Major FULLER. We have more guns than that, but those are in condition that require overhauling.

Mr. KEIFER. They are all four-gun batteries?

General CROZIER. Yes, sir.

Mr. SMITH. How many guns have you got to be repaired under this item, and how many guns have been delivered up to date. The mobile artillery does not seem here to be limited to mountain, field, and siege guns.

General CROZIER. Of those that are in use and subject to this item there are 224, about. Wait a minute; then there are 8 more; that makes 232. Of course with each one of those guns there are three caissons corresponding. There is the gun and gun carriage and three caissons; so that makes three times that many vehicles.

Mr. SMITH. You say 232 guns and the corresponding vehicles?

General CROZIER. Yes, sir.

Mr. KEIFER. Two caissons to each gun?

General CROZIER. No; three caissons to each gun. We have had to increase the supply of ammunition like everything.

Mr. KEIFER. I see.

REPAIRS TO GUNS.

Mr. SMITH. Your estimate amounts to an average repair for every gun in the field of $325. That is for the gun and the equipment of the caisson?

General CROZIER. Take this item of wheels that I spoke about; there are sixteen wheels to each gun.

Mr. SMITH. But does this lightness of the wheel—I supposed that only affected the guns themselves.

General CROZIER. The wheels are all interchangeable.

Mr. SMITH. Is it necessary to have a wheel of the same resistance on the caisson as on the gun itself?

General CROZIER. Yes, sir. With the material which has recently been replaced, the gun was mounted rigidly on the carriage and had no recoil, and when it was fired it produced a very violent action on the carriage, as you can see. There was nothing to soften the action between the gun and the carriage. In general, if the carriage was strong enough to withstand that action on the gun, it was strong enough for the road strain. With this new material we have so softened the shock of the action of the gun on the carriage that, so far as it is concerned, the material might be made very much lighter than it was before, and, as a matter of fact, it is made very much lighter; but it is no longer the case that firing strain is greater than the road strain. The road strains are now the troublesome ones, and it is in use in marching and in drills and in maneuvers that a certain weakness has developed that we have had to correct.

Mr. SMITH. There has been no increase in modern times in the road strain?

General CROZIER. No, sir; there has not been any increase, but when we diminished this firing strain, of course we wanted to take advantage of that, on account of the continual struggle there is between power and mobility. We, in some cases, lightened them too much. You understand that it is exceedingly difficult to compute the road strains. Almost the only way to determine them is to have an actual trial and the process of designing field artillery or anything of that sort that is to be used out in a rough country is very much like the process of designing a racing yacht. There is no very good way to tell whether you have it strong enough without a trial, and if you take it out and give it a severe trial and nothing breaks you may be pretty certain that you have made the material too heavy.

Mr. SMITH. When did you make this change in the wheel?

General CROZIER. We are in the process of actually making it now. It was decided on sometime during the past six months.

Mr. SMITH. So that even the guns you have mounted in the last year are defective in this respect?

General CROZIER. The ones we have sent out in the last year are about the only ones in service. We were just beginning to get them in service. This summer we have had a service trial and they have been given a very severe one.

Mr. SMITH. Do you have any idea, after this structural defect is corrected, that it is going to cost $325,000 a year for repairing?

General CROZIER. To maintain them in condition?

Mr. SMITH. Yes, sir.

General CROZIER. No, sir; I do not believe it will cost one-third of that amount.

Mr. KEIFER. When you speak of taking them out and testing them, you do not mean to drill them on a plain open country like out at Fort Riley. They would have to be run over roads and through gullies and up mountain places and down, and so on, to test the strength of the wheels and axles and everything?

General CROZIER. One captain of a light battery has reported that during the process of the maneuvers they had during the past summer practically every vehicle of his battery had been overturned sometime during the summer. Others have reported various accidents to their guns, and you can understand that when a vehicle is going at a sufficiently rapid rate and strikes a sufficiently rough obstacle to overturn it, it has received quite a shock. In reference to this matter, I will say that one captain of a battery, who is out at Fort Riley, and who has recently been military attaché at one of the foreign embassies, has said that he is familiar with pretty much all the foreign field artillery and he thinks ours is the most resisting construction that has been built by anyone.

Mr. KEIFER. The danger of breaking an axle is not great any more?

General CROZIER. We have not had any case of that sort this summer.

Mr. KEIFER. I mean in firing?

General CROZIER. No, sir. That used to occur very frequently.

Mr. KEIFER. I have seen guns run out in the wheat fields in 1863 after a heavy rain sink down as deep as the ground had been plowed, and they would undertake to fire them and every other one would knock off an axle. As a matter of fact, that would soon have a battery out of use altogether.

General CROZIER. That does not happen any more; no, sir. One captain reported that an axle was sprung, but that was the only one, and we do not know what sprung it.

I will say about this, also, that we are thus far without experience as to what it is going to take to keep this new material in order. This is the first year the people have had it, and this is altogether an estimate.

ALTERATION AND MAINTENANCE OF MOBILE ARTILLERY.

Mr. SMITH. I would like to ask you how we came to give such large appropriations in previous years for the alteration and maintenance of this mobile artillery—you were not spending much on the old batteries?

General CROZIER. We were spending something on them right along. You gave us last year $50,000, and that has got to last now until the 1st of next July, seven months yet, and we expect that this $75,000 which we have asked for this year will last until June 30, 1908.

Mr. SMITH. I would like to ask you if you know what a new set of wheels for a gun and its caisson costs?

General CROZIER. About $45 a wheel. There are 16 wheels for a gun and caisson, 80 wheels in a regular battery.

Mr. SMITH. I understand the change of wheel requires a change of hub?

General CROZIER. We expect to change most of these wheels by changing a part of the hub. This is a built-up hub, mostly of steel, and by changing one part and using part of the old material we expect to get off with a good deal less than $45 a wheel.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, SUBCALIBER TUBES, ETC., FOR MOUNTAIN, FIELD, AND SIEGE PRACTICE.

Mr. SMITH. This next item ought really to follow the one with reference to the mobile artillery, ought it not?

General CROZIER. It ought to come pretty soon thereafter.

Mr. SMITH. It is identically the same subject-matter, is it not?

General CROZIER. Yes, sir.

Mr. SMITH. When you use the language "rapid-fire material," you mean the guns and not the ammunition?

General CROZIER. It means the guns and gun carriages. The words "field-artillery material" covers everything, and would really cover ammunition, while there is no alteration in the ammunition intended to be made.

Mr. SMITH. There is no ammunition to remodel under this item?

General CROZIER. No, sir.

Mr. SMITH. You can expand the size of the material, but not reduce it?

General CROZIER. You can not use a projectile for any other caliber, larger or smaller, than the gun it is made for.

Mr. SMITH. Can not you put on bands?

General CROZIER. Yes, sir; but you would have to put on two bands.

Mr. SMITH. You can not reduce it?

General CROZIER. No, sir; you would probably make the wall so thin that it would break up entirely.

Mr. KEIFER. That would involve a good deal of expense?

General CROZIER. We do not contemplate doing it. The idea of this is to take some of the guns, a number of which we have on hand, and make the necessary changes so as to give the guns a longer recoil on the carriage, and convert them into rapid-fire guns. We have not done any of this as yet, but other people have, and that will take the place of a certain number of new guns.

Mr. SMITH. At the top of page 13 there is the item, "For the purchase, manufacture, and test of ammunition, subcaliber tubes, and other accessories for mountain, field, and siege artillery practice, including the machinery necessary for their manufacture at the arsenals." I suppose this is an item upon which the Chief of Artillery will want to be heard. Have you any information that the practice has been inadequate during the past several years, when we have been appropriating $77,000 a year?

General CROZIER. No. It is only during the current year that they have had this new material. Before that they had the 3.2 inch. We slacked up a little on the target practice; we did not give them so much. I have a table here which shows exactly what that money is to be expended for, the larger part of it. I do not know that it

would make the matter any more clear if I were to read it to you, but it starts out with 15 batteries equipped with 3-inch field guns. Then there is given the shrapnel and the common shells and the ammunition which they use for subcaliber tubes and blank cartridges, and the total amount is $37,776. Then we have six batteries equipped with the same guns stationed at the Cavalry and Artillery School at Fort Riley. That is the school of instruction where all the methods are established, and they are given a larger allowance, so that the total amount for those batteries is $27,704. Then, we have six batteries equipped with mountain guns, and the allowance is $9,977.

Mr. SMITH. Under the $77,000 appropriation we have given you, how many times a year is the artillery allowed to fire without subcaliber tubes?

General CROZIER. I do not know how they divide it up. The allowance that was given is so many rounds of shrapnel and so many rounds of common shells for each battery.

Mr. SMITH. Perhaps we had better press that inquiry further with the Chief of Artillery when he is here. This is a matter in which I take it you have not a great interest, except in a general way.

General CROZIER. My business is to supply them. Of course the Chief of Artillery could say better as to how many rounds are necessary for each battery in order that they may be made efficient. It is a pretty difficult thing to say.

EFFICIENCY IN MARKSMANSHIP.

Mr. SMITH. During the last year how proficient have they proven in their marksmanship with the mobile artillery; has the record been one of satisfactory efficiency?

General CROZIER. Yes, sir; they have done very well.

Mr. SMITH. As compared with other armies of the world?

General CROZIER. We are pretty well satisfied with it; they have done very well.

Mr. SMITH. And that with the new gun?

General CROZIER. Yes, sir.

Mr. KEIFER. Most of this appropriation is for experiments with the new field gun?

General CROZIER. For practice with the new field gun.

Mr. KEIFER. You are not paying much attention to the older one?

General CROZIER. None of them has the older ones now; they are all turned in. This item includes field, siege, and mountain artillery, and the siege artillery is still old.

ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY.

Mr. SMITH. As to the item "For the alteration and maintenance of the seacoast artillery," have there been many changes made in any respect in the seacoast artillery in the last two or three years?

MORTAR CARRIAGES, IMPROVEMENT OF.

General CROZIER. Not very many changes. The most important item that is intended to be covered by this estimate is one in mortar carriages, which is for the purpose of enabling us to fire a larger

charge at a higher elevation than contemplated when the carriages were built, and we have in this way strengthened the carriage so that it will endure the greater recoil. Then, there is the disappearing carriage. The earlier models were provided with a cumbersome apparatus, supposed to be good enough at the time, but now considered obsolete, for pulling these guns down for firing and loading. In practice and drill this becomes very tedious on account of the length of time required and the necessity of pulling them down by hand, and it was thought that time could be devoted to more useful drill, and so it has been considered well to supply the earlier carriages with this better apparatus. New traversing gearing and better sights are also required and these changes will make an item which will amount to about $150,000.

Mr. SMITH. Do I understand it is estimated by you that it will cost annually and perpetually more than $500,000 a year for the mere item of alteration and maintenance of the Seacoast Artillery?

General CROZIER. No, sir. Two items I have just mentioned will be done once for all.

Mr. SMITH. In 1905 you estimated for $864,000, but you got $500,000. You have received, however, in the last three years, nearly a million and a half of dollars. You received $500,000, $560,000, and $320,000, about $1,400,000, so that you seem to have been drawing nearly $500,000 for this one item of the alteration and maintenance of the Seacoast Artillery?

General CROZIER. Yes, sir.

Mr. SMITH. Is it your anticipation that this item is going to hold up to that point?

General CROZIER. It will hold up there for some little time, because these mortar carriage alterations will go on for some little time.

Mr. SMITH. How much will it cost in the aggregate?

Major FULLER. This takes up just about half of the carriages.

Mr. SMITH. Is this item one in which there would be 5 per cent depreciation when there was no use but practice use?

General CROZIER. It covers more than depreciation. Since the year 1888, when we commenced this process of the armament of the seacoast fortifications, we have not had to throw out anything that we have been using. None of the gun carriages, none of the mortars or ammunition have been rendered obsolete and useless, so that we have had to discard it, but we have made a good deal of alteration for the purpose of bringing it up to date, and we have succeeded thus far in keeping efficient and useful for the most modern purposes all the material we have put in. Therefore this item of alteration and maintenance, although it may seem large for the mere purpose of covering repairs, is not very large when you consider what we have accomplished by it. This change in the mortar carriages should be made on 391 carriages, which are all we had in comtemplation last year, because the new ones do not need it, and the amount required for alteration would be $1,368,500, and we will be all through with that thing when we spend that money, and we made that estimate last year, contemplating doing it in six years. We expected last year to spend $240,500 on that particular alteration. This year we have cut it down.

Major FULLER. This last year we had only $77,000 for that alteration.

General CROZIER. This year we have estimated to spend a hundred thousand dollars.

Mr. GRAFF. I thought you said $150,000?

General CROZIER. For putting the new retraction, traversing, and sighting devices on the carriages. Here was this carriage that I am speaking of, the disappearing carriage, the model of 1894, that is twelve years ago. By spending this comparatively small sum of money, compared to its value, we will bring it up so that we have no idea of replacing it in the indefinite future at all.

ALTERATION OF THREE AND TWO-TENTHS MATERIAL TO RAPID-FIRE FIELD MATERIAL.

Mr. SMITH. We now come to this item at the top of page 14 that we were talking about informally—the alteration of the 3.2-inch material. I think you had some good reasons for that last year and did not get it?

General CROZIER. We did not get any. It was included in the Field Artillery.

Mr. SMITH. What number of these guns have you estimated that you could reconstruct or remodel with this amount?

General CROZIER. About 100 guns.

Mr. SMITH. How many of the old guns have you?

Major FULLER. Three hundred and sixty-two. That includes all the old ones we have.

Mr. SMITH. How many of the new guns do you say the money already appropriated will finally furnish you?

General CROZIER. Something over 300.

Mr. SMITH. So you now have money appropriated for more of the new type of gun than you ever had of the old?

General CROZIER. Yes, sir.

Mr. KEIFER. This item provides for some experimental work. You never have used money for that purpose before?

General CROZIER. No, sir.

Mr. KEIFER. Have you done anything that leads you to believe that this would be a success?

General CROZIER. We have done it pretty well on paper. Other people have done the same thing; in Mexico, for instance.

Mr. BRUNDIDGE. How many guns will this alter?

General CROZIER. About 100.

Mr. KEIFER. If you alter a hundred guns, they will take the place of other field guns?

General CROZIER. Yes, sir.

Mr. KEIFER. In assigning them to the Army—the infantry and the cavalry?

General CROZIER. Yes, sir; this estimate would alter about 20.

Mr. KEIFER. Are the guns as good as the guns of a new battery?

General CROZIER. Yes, sir.

Mr. KEIFER. And you regard that, if a success, as a great saving?

General CROZIER. Yes, sir; the cost of a new battery is about three times that.

Mr. KEIFER. Are the guns as good as the guns of a new battery?

General CROZIER. Pretty nearly. The excellence of the new battery does not consist so much in the improvement of the gun as in the improvement of the carriage.

Mr. KEIFER. The recoil and everything?

General CROZIER. Yes, sir.

Mr. SMITH. Would it not be amply sufficient if we gave you sufficient money to alter one battery, and let you alter one battery and see how it works before attempting all the balance?

General CROZIER. I am engaged now in altering one gun out of the funds I have available for that purpose. The appropriation for Field Artillery is available for that purpose, and I have taken enough to alter one gun. That is under way now, and it is based on the probability of success of that that I make this estimate.

Mr. BRUNDIDGE. How long before that will be completed?

Major FULLER. Very early in the next year we will have that done—by next summer.

General CROZIER. I hope so. Then we would have to wait a year before we could get any money to alter any more guns if the appropriation were not made now. If I could determine whether this is successful and right then ask you for the money, I would not ask for it now.

Mr. SMITH. I would like to ask whether it would not be wiser to give you under this item an amount sufficient to reconstruct a battery? That would give you some little work to do this year.

General CROZIER. Yes, sir.

Mr. SMITH. And at the same time we trust that there will be no immediate emergency requiring field guns.

Mr. KEIFER. You can tell with your one gun if it is going to be a success as well as with a battery?

General CROZIER. Yes, sir. The only thing is, however, when we get a battery we could send it out in the field and could tell all about the things that can be told in service and can not be told on the proving grounds.

Mr. KEIFER. You could send one gun out and do pretty nearly the same thing?

General CROZIER. Yes, sir; I think so.

PROVING GROUND, SANDY HOOK, NEW JERSEY.

CURRENT EXPENSE AND MAINTENANCE.

Mr. SMITH. Under the item, "For current expenses and maintenance of the ordnance proving ground, Sandy Hook, New Jersey," the amount is exactly the same as last year's appropriation, and the appropriation has been the same for four successive years. Is there any surplus in this fund?

General CROZIER. No, sir. That fund is nearly always poor. I asked for an increase of it about four years ago, and they gave me what I asked for, and I said that would be enough, and I will stick to it. The fund is poor.

Mr. KEIFER. That is a matter of target practice, and is about the same all the time?

General CROZIER. Yes, sir. That item covers a good deal of general repairs incidental to testing. We run a boat and 6 miles of railroad.

Mr. SMITH. But you do not keep up the repairs out of this fund?

General CROZIER. Not altogether, because we have a separate item in the bill for repairs to railroad, $6,000.

EXPENSES OF OFFICERS TEMPORARILY EMPLOYED.

Mr. SMITH. The next item has been the same, $18,700, for some time, and the estimate is the same this year. Is this amount found to be excessive?

General CROZIER. No, sir. I have explained several times how that part of the fund is expended, and I would like to keep the committee well informed about it, if you will bear with me a few moments. That is the portion of the fund that is covered by the $2.50 per day for the expense of officers while temporarily employed there. There are no separate quarters for officers belonging to the Ordnance Department. There is one large house where the officers on duty stay while at Sandy Hook. There are five sets of quarters belonging to the artillery which we borrow and which are occupied by five ordnance officers. I have 12 officers there, and the others are not provided for. The others live at some other place—two of them at Governors Island and the rest at New York City or somewhere in the vicinity—and when they are at Sandy Hook they are away from the station where they have quarters, and they receive this $2.50 a day, which they never get in their hands, but it is turned over to the officer appointed by the commanding officer who runs this house in which each one has a room and where you gentlemen will be very welcome whenever you will honor us with a visit.

Mr. KEIFER. They also have a mess hall?

General CROZIER. Yes, sir; it is also for the accommodation of manufacturers of projectiles that are tested who come there, and citizens who are always having business at the proving ground, and when they come there it is necessary to maintain a place of this kind because it is 6 miles from the nearest town. That is what the $2.50 is used for.

REPAIRS OF RAILROAD TRACKS.

Mr. SMITH. The next item is "for repairs of railroad tracks." Is that sum used in the making of repairs every year?

General CROZIER. Yes, sir.

LOCATION OF POWDER FACTORY.

Mr. SMITH. The exact location of the powder factory authorized by the last bill has not been determined.

General CROZIER. No, sir.

Mr. SMITH. Have the plans for the buildings and the like been drawn?

General CROZIER. Yes, sir; part of the machinery we have advertised for.

Mr. SMITH. So that considerable progress has been made toward establishing this factory, only it has not been definitely located?

General CROZIER. No, sir.

FORTIFICATIONS IN INSULAR POSSESSIONS FIRE-CONTROL STATIONS.

Mr. SMITH. At the bottom of page 18 I notice there is an attempt to insert a large separate item for the engineer's department alone, as I understand the item. Do you know any reason why the language of this provision is changed from the language with reference to continental United States?

General CROZIER. I had not seen the language before.

Mr. SMITH. Do you know of any reason why the language used with reference to fire control in the insular possessions should be different from the language used with reference to the continental United States?

General CROZIER. As to the insular possessions we have made our own estimates and this estimate here, you will observe by the note, covers only the engineer work.

Mr. SMITH. Congress having decided to no longer separate appropriations for the Engineer Department, the Ordnance Department, and the Signal Corps here in the continental United States with reference to fire control, can you think of any reason why a different policy should prevail in the insular possessions?

General CROZIER. I can only think of one point in connection with it that might be possibly a reason for appropriating differently. At the time when Congress commenced to make the appropriations for the three departments the Ordnance Department was considerably ahead of the other two, and in order to bring the three departments into proper relation to each other the thing was put in one sum under the control of the Secretary of War.

Mr. SMITH. But the very object of Congress was that forever hereafter it might be kept balanced, and that the Secretary of War might apportion it to these departments, so that the work could progress steadily and uniformly.

GUANTANAMO, CUBA.

This being an item for fire control and that control being of no use without guns, I want to ask you what guns we have at Guantanamo, Cuba?

General CROZIER. Four 15-pounders, four 6-inch and two 12-inch guns.

Mr. SMITH. Are they already mounted?

General CROZIER. Not mounted, but appropriated for and allotted to that harbor in process of construction and installation.

Mr. KEIFER. In the process of being mounted?

General CROZIER. Built and mounted.

Mr. SMITH. How long will it be before any guns are mounted?

General CROZIER. That depends on the engineers. Our part of the work is very nearly ready now.

Mr. SMITH. Do you have any idea when you will be called upon to mount them? From your information, when will they be ready for you to go to work?

General CROZIER. I would expect it any time—certainly this fiscal year.

Mr. SMITH. Some of these guns will be completely mounted and ready for use?

General CROZIER. We will be called upon to put them in position.

Mr. SMITH. That is not the question. I would like to know if any guns, in your judgment, will be mounted and ready for use within the next fiscal year.

General CROZIER. I can not speak with exact knowledge in regard to that, because I do not construct the implacements.

Mr. SMITH. None of the guns is mounted at Guantanamo?

General CROZIER. No, sir; there is none there.

HONOLULU AND PEARL HARBOR, HAWAIIAN ISLANDS.

Mr. SMITH. How many guns have been actually mounted at Honolulu and Pearl Harbor?

General CROZIER. None. Two 12-inch guns have been estimated for in this bill.

Mr. SMITH. What information can you give, if any, as to when any guns will be mounted and ready for use at Pearl Harbor and Honolulu?

General CROZIER. I can not say, because none is appropriated for.

Mr. SMITH. It is safe to say that it will be impossible to erect any there during the next fiscal year, is it not?

General CROZIER. Yes, sir; this fiscal year.

Mr. SMITH. Can you make and mount a gun within the next fiscal year?

General CROZIER. No, sir.

MANILA, P. I.

Mr. SMITH. Now, what guns, aside from the Spanish guns, are actually mounted at Manila?

General CROZIER. None.

Mr. SMITH. How soon, in your judgment, will there be any of our own guns mounted?

General CROZIER. Within this fiscal year, I hope.

Mr. SMITH. Which ones?

General CROZIER. There should be some 10 and 12 inch guns, the guns that were provided for in the act of April, 1904.

Mr. SMITH. We gave you some guns from continental United States for use in the Philippines?

General CROZIER. Yes, sir.

Mr. SMITH. They have not been mounted?

General CROZIER. They are already mounted. The carriages have to be provided and the fortifications built. It is the building of the fortifications that will supply the place for the guns and carriages.

Mr. SMITH. Do you hope to have some of them mounted by the 1st of July?

General CROZIER. I hope so.

SUBIG BAY, PHILIPPINE ISLANDS.

Mr. SMITH. What guns are mounted at Subig Bay?

General CROZIER. None.

Mr. SMITH. What emplacements have been built at Subig Bay for any guns?

General CROZIER. I understand there are some emplacements for 10-inch rifles under construction now—I am quite sure—and also for 6-inch rifles. These were provided for in the bill of April, 1904.

Mr. SMITH. No money was assigned to the fortification of the Philippines from last year's bill?

General CROZIER. Yes, sir; three 6-inch guns were assigned to Manila; that was all.

INSPECTING INSTRUMENTS, ETC., PURCHASE, MANUFACTURE, AND TEST OF.

Mr. KEIFER. I want to call attention to the item at the bottom of page 21, "For purchase, manufacture, and test of inspecting instruments for the manufacture of cannon, carriages, and ammunition, etc." Does that come within your office?

General CROZIER. Yes, sir; that is mine. That is the item we were talking about a moment ago.

SEACOAST CANNON—PURCHASE, MANUFACTURE, AND TEST OF.

Mr. SMITH. The next item that you are interested in is in the middle of page 20, I believe?

General CROZIER. Yes, sir. I would ask you to increase that estimate from $948,000 to $1,013,600—that is to say, $65,000.

Mr. SMITH. Can you state how much it will be necessary to appropriate under this item upon the assumption that no additional appropriation was made for the engineer department for seacoast batteries anywhere in the islands? That is, I am anxious to find out what is necessary to balance your allowance with the engineer department for the construction of seacoast batteries.

General CROZIER. To arm one battery of four mortars would cost $90,000, and that would bring us together. I can account for part of it in the way we managed to overcome a part of the discrepancy in the manufacture of mortar carriages.

Mr. SMITH. My judgment is that you furnished me either in the form of a letter or otherwise a statement you had made to the Senate committee, showing quite a wide discrepancy between the allowance for this item and the allowance already made to the Engineer Department. I may be in error, but that is quite a firm opinion.

General CROZIER. Did that partially disappear when the appropriation was cut down last year?

Mr. SMITH. No; my recollections is that you did not get a cent last year to cover anything that the Engineer Department got last year; that the final agreement brought you up to what the Engineer Department had previously received, and whatever we gave the Engineer Department last year was ahead of you.

General CROZIER. I can tell you what I got last year.

Mr. SMITH. You got $400,000 last year.

General CROZIER. In guns and carriages I got one 15-pounder, three 6-inch, four 12-inch, and two 12-inch mortars.

Mr. SMITH. We gave you $400,000. Why do you want this $65,000?

General CROZIER. That is composed of several items. We had three 3-inch carriages estimated for at $3,500 apiece. We find we can not get them for less than $4,500. We left out altogether by an error the carriages for five 3-inch guns, which at $4,500 each would mean $22,500. Then we found on account of the great difference in price that the two 6-inch carriages which were included in that estimate would cost $8,000 more than we expected, and then we had omitted any estimate for tools and machinery and that class of articles, which would amount to $32,000.

Mr. SMITH. Was this estimate made after conference with the engineer department as to the proposed appropriation this year for the construction of seacoast batteries in the Philippines?

General CROZIER. Yes, sir.

Mr. SMITH. If, then, the committee should very greatly reduce this allowance for seacoast batteries in the insular possessions it would result in an equal percentage of reduction in this item?

General CROZIER. Yes, sir.

Mr. SMITH. I have not any idea that Congress will appropriate $2,200,000 this year, unless it becomes alarmed over some unforeseen cause. I notice that your estimate is about 50 per cent of the engineer department.

General CROZIER. One reason why that is so small is because we have these 10 and 12 inch guns on hand.

Mr. SMITH. Suppose this item on page 18 should be reduced to, say, $600,000, as it passed the House last year, could you tell me how much that would reduce the estimate for seacoast guns in the insular possessions?

General CROZIER. We are only asking to use one of the 12-inch guns we have on hand, and the other guns we expect to build—14-inch guns, and some 6-inch guns, and some 3-inch guns, and some 12-inch mortars, none of which we have on hand.

Mr. SMITH. Notwithstanding what you said about the advantage of the 14-inch guns, why do you not mount the guns that have been given to the insular possessions from the continental United States before building new 14-inch guns for those same localities; you say you are only arranging to mount one of them?

General CROZIER. The 12-inch guns which we have available for use, for the reason which I explained some time ago, can not be used at the power at which we expect to use them, and therefore in the places where that power is needed (which are the places where we contemplate putting these 14-inch guns) we have to put the 14-inch guns or we do not get the power, or we wear out the 12-inch guns too fast.

Mr. SMITH. The 12-inch guns have got to be worn out or thrown on the scrap pile?

General CROZIER. Yes, sir.

Mr. SMITH. The longer you keep them the more obsolete they become. Ought they not to be mounted soon and utilized, rather than to leave them until they become more and more obsolete and build the new guns?

General CROZIER. We expect to work them all in and mount them all in the scheme of coast defense that we have here, if you will carry it out. You see the 12-inch gun, even at the reduced power we propose to use it, will do anything we expect to do with it up to 6,000 yards.

Mr. SMITH. And for some locations it would still be suitable?

General CROZIER. Yes, sir; simply because the 12-inch gun is not up to the job in those places unless we use it at a power which would wear it out too soon.

Mr. SMITH. So that for this year if we reduce the engineer estimate for seacoast batteries two-thirds you think we can do the same with yours without getting you out of balance?

General CROZIER. Provided they make the constructions accordingly. Sometimes in cutting out proportionately they abandon one thing and go to something else. They might say that they will cut out all the mortar batteries they intended to construct and put all the money in gun batteries instead of constructing a correspondingly less proportion.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION—SEACOAST CANNON FOR INSULAR POSSESSIONS.

Mr. SMITH. The next item is, "For purchase, manufacture, and test of ammunition for seacoast cannon for the insular possessions, including the necessary experiments in connection therewith." In this item I think I deceived the House last year, unintentionally. We cut your estimate to $100,000. It was then called to the attention of the House that no seacoast cannon were mounted at all in the insular possessions and that they did not need a reserve until they got some guns up, and a motion was made to strike out the $100,000. I opposed it on the floor upon the ground that before the time of the new fortifications there would be certain guns mounted in the insular possessions, as I understood from some of the hearings, but there is none as yet. You already have now $200,000 on hand for ammunition in reserve and no guns mounted. I take it that there can not be any emergency for a very large appropriation for this purpose now until some gun is mounted somewhere?

General CROZIER. No, sir; but when that gun gets mounted, if you give us the money for ammunition that does not mean that we have the ammunition right away; it takes a good while to get it.

Mr. SMITH. Would not $200,000 buy all the ammunition that would fully supply all the guns you will have mounted in a year; not in the United States over a period of years, but will it not fully supply all the guns you will have mounted within a year with a full reserve?

General CROZIER. It is a little hard to say. It will make a pretty good hole in the amount that is necessary.

Mr. SMITH. Do you not think if you take all the guns you will have mounted by a year from July, $200,000 would furnish those guns with a better reserve than you have for the continental United States?

General CROZIER. Yes, sir; of course we ought to have a better reserve there.

Mr. SMITH. That is true. Could you give me any idea as to the guns that you fully expect to have in position ready for use by the 1st of July, 1908? How much would be requisite to furnish those guns with the full reserve that you contemplate as necessary?

General CROZIER. The guns that have been provided for up to the present time by the appropriation bills already passed I think ought all to be mounted before the 1st of July, 1908. In the last bill we got very little.

Major FULLER. Four 12-inch, two 3-inch and carriages, and one 15-pounder.

Mr. SMITH. You will not have all the guns from continental United States mounted because you have not even planned to erect them at any place?

General CROZIER. Yes, sir.

Mr. SMITH. You said you were only planning to erect one under this bill. Last year we gave you some additional guns from continental United States for use in the insular possessions. You have not even planned to erect more than one by this bill?

General CROZIER. Yes, sir. We are in this bill only asking you to allow us one additional gun.

Mr. SMITH. You told me, if I understood you correctly, that in this estimate of an expenditure of $1,013,000 there was a provision for putting up new 14-inch guns, but only one of the guns from the continental United States.

General CROZIER. We are only asking you to give us one more gun from the United States.

Mr. SMITH. Then you evidently do not understand the question. I asked you why you erected the 14-inch guns before you put up the 12-inch guns we have given you from the United States?

General CROZIER. I did not understand the question. I understood the question to be why are we contemplating these 14-inch guns in the insular possessions before we use up the 12-inch guns we have in the United States.

Mr. SMITH. My question was why you erected the 14-inch guns before you put up the 12-inch guns we have given you from the United States.

General CROZIER. I thought you referred to those of the United States.

Mr. SMITH. That was the cause of the misunderstanding.

Mr. KEIFER. Those are all the guns to be constructed—I do not know the amount of this bill or of the previous bills—but all of those to be provided for and put in place?

General CROZIER. Yes, sir.

SEACOAST GUNS TO BE MOUNTED JULY 1, 1908, NUMBER OF.

Mr. SMITH. How many seacoast guns do you estimate will be mounted by the 1st of July, 1908?

General CROZIER. By that time we ought to have four 15-pounders, six 6-inch guns, three 10-inch guns, two 12-inch guns, and four 12-inch mortars.

Major HORNEY. There should be six 12-inch rifles.

General CROZIER. That will be by July, 1908.

Mr. SMITH. Of course ammunition is the minor cost?

General CROZIER. Yes, sir.

That leaves you twenty-six 6-inch guns outside of those that you hope to have up before the end of the next fiscal year. Would not $10,000 against any reserve be sufficient, or would it not be as much as you have to-day in the United States?

General CROZIER. Let us see. What does a 12-inch gun cost to fire? This means a steel projectile.

Mr. SMITH. How many rounds do you estimate that a 12-inch gun will fire?

General CROZIER. We can fire a 12-inch gun at the rate of thirty rounds an hour. That would be a round every two minutes. It will do better than that. You can fire a round in one and a half minutes.

Mr. KEIFER. That would be very fast firing.

General CROZIER. It would be, but it is done in target practice.

Mr. KEIFER. In target practice, but not while they are moving.

General CROZIER. We practice with the moving target. We have done that and had forty-five seconds between rounds.

Mr. KEIFER. It would be hard on the gun.

General CROZIER. It wears out a gun in a short time.

Mr. SMITH. I do not see but you would wear the gun out in that way in an hour.

General CROZIER. We are proposing to cut the velocity down.

Major HORNEY. The 12-inch, model 1900, rifle costs $309.82 per round. The 1895 model costs somewhat less.

Mr. SMITH. The 240 rounds would be $74,400.

Major HORNEY. The 10-inch rifle ammunition costs $137 per round.

Mr. SMITH. How rapidly will that firing be done?

General CROZIER. It will fire faster than the 12-inch, but you can put it down pretty nearly the same.

Major HORNEY. The 6-inch gun ammunition costs $38.44 per round.

Mr. SMITH. How often do you fire that gun?

General CROZIER. The 6-inch gun can fire faster—say, four rounds a minute, or 240 rounds in an hour.

Mr. SMITH. That is only $3,120.

Major HORNEY. To the prices I have given for target practice ammunition we have to add the cost of the armor-piercing projectile—$120 to the round of 12-inch ammunition.

Mr. SMITH. That spoils all these figures. How much does the 10-inch gun cost?

Major HORNEY. The 10-inch gun costs $190 per round.

Mr. SMITH. We will figure that the 10-inch gun could be fired for $190 per round, and three guns fired forty times would be $22,800.

Major HORNEY. The 6-inch gun would cost $52 per round. It could fire four rounds a minute.

Mr. SMITH. We figured that at 120 rounds per hour. It should be 240, which should be multiplied by 13. The value of this arm at $52 per round should be $74,880. You have 12 mortars. How many rounds will they fire?

Major HORNEY. They will not fire so fast as the other two—about 30 rounds an hour. The price is $105 for the deck-piercing shell ammunition.

Mr. SMITH. Two hundred thousand dollars in round numbers would complete the reserve for all the guns up to this time?

General CROZIER. Yes; to fire one hour. You will remember that we had one hour in our minds for the United States, where, if one of our coasts were threatened, we could send ammunition from another to increase the supply. We have three coasts—the Atlantic, the Gulf, and the Pacific. In the Philippines all coasts would be threatened at once.

Mr. SMITH. I realize that too. It would require a larger reserve, I think.

General CROZIER. If you follow the rule out you will have to modify it. It would make us better off in the Philippines than in the United States. Here is a statement in regard to the estimate in this bill for the insular possessions. If we add to this estimate the amount already appropriated, it will be sufficient to supply 77 per cent of the reserve for the guns in the insular possessions.

PURCHASE, MANUFACTURE, AND TEST OF INSPECTING INSTRUMENTS, INSULAR POSSESSIONS.

GUN-CARRIAGE MANUFACTURING, ETC.

Mr. SMITH. For gun-carriage manufacturing, instruments, range finders, and machinery necessary for manufacturing at arsenals, etc. If you decide to adopt the language, "Arsenals of the United States," with reference to range finders, when you speak of the amount for the insular possessions, how much of this estimate should be transferred to that item?

General CROZIER. The whole of it, if you put in that language. Is there any language for machinery in the United States item?

Mr. SMITH. I will go back and see. It says, "For construction of fire control, including electric lights, wires, and all special instruments, including signal apparatus, salaries," etc., and for the purchase of instruments and machinery.

General CROZIER. Then you can take it all out.

Mr. GRAFF. Do you propose to unite this last item covering the continental United States?

Mr. SMITH. No. In previous years it was the practice to make appropriations for ordnance, making one for the Engineer and one for the Signal Corps, to cover their respective expenses in installing fire control, but it was found, owing to our lack of skill in each department, that one department got ahead of the other—that is, the Engineers would have enough for two cities, while the Ordnance and Signal Corps would have enough but for one; and it therefore was determined to make a general appropriation for fire control, and now comes the Engineers' Department asking an enormous appropriation for this purpose. I am unable to see why the same reason would not make the appropriation applicable between the three departments, would not make them applicable to our insular possessions.

Mr. GRAFF. The object is to unite all in one as to fire control.

Mr. SMITH. To keep them balanced.

Mr. KEIFER. It gives liberty to use fire control where it is needed most.

General CROZIER. We can do that anyway.

Mr. KEIFER. Is it in separate parts?

Mr. SMITH. You can give to the Ordnance a certain amount and to the Signal Corps a certain amount.

ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY, INSULAR POSSESSIONS.

Mr. SMITH. We now come to the item of repairs and alterations to seacoast artillery in the insular possessions. If I remember rightly, the real object is to build a repair shop, as indicated a year ago.

General CROZIER. To install certain machinery. We have a shop out there now; but last year's appropriation was for a little bit of a house, not much larger than this room, down near the fortifications.

Mr. KEIFER. Near what fortifications?

General KEIFER. Down at the mouth of Manila Bay. In taking care of the seacoast fortifications we have to have at each of the harbors—a good many of them are of considerable size—a little repair shop, where we employ one man with two or three pieces of machinery, which are operated by electric power, so as to make small repairs. That is what the $5,000 was for—to equip such a shop as that.

Mr. SMITH. You ask $25,000 this year for that item. There are, of course, practically no repairs. This is purely in the way of what is prospective.

General CROZIER. That is all.

Mr. SMITH. There are no guns and no repairs?

General CROZIER. No.

Mr. SMITH. What is the fact as to your ability, by paying for it to get service, until you can get a considerable establishment there, from the navy-yard employees and navy-yard machinery for repairs?

General CROZIER. We have there at Manila now an arsenal, where we have machinery installed, and we could make considerable repairs, but we have no money specially provided for it. As to the repairs which would necessitate the handling of larger pieces in big machines, I fancy we could get the use of the navy-yard machinery. They have a more extensive establishment at Cavite than we have at Manila.

Mr. SMITH. Are not those so-called "arsenals" rather depots?

General CROZIER. We employ some 200 men there. We have lathes, planers, and milling machinery.

Mr. SMITH. You call it an "arsenal?"

General CROZIER. It is the Manila Ordnance Depot; but it is really an arsenal.

Mr. SMITH. Was it an arsenal in Spanish days?

General CROZIER. Yes. We took over the power plant, shops, and machinery.

Mr. SMITH. Of course you realize that while this item is small in one sense, it looks large for alterations and repairs and putting guns in place.

General CROZIER. It must last until July, 1908.

Mr. SMITH. But we have been talking to-day about a 5 per cent allowance for alteration of seacoast guns, which would run you up to 1908, and the guns will be brand new.

General CROZIER. One portion of this expense will include the pay of the machinists who will be used in setting up gun carriages. We employ out of that appropriation for alteration and maintenance of seacoast artillery a certain number of men who are peripatetic machinists and go around from one fortification to another, and

wherever a gun is monuted they do it, reporting to the engineer in charge. This is indispensable for the proper installation of the gun.

Mr. SMITH. Why should it not be paid out of the fund for construction?

General CROZIER. It has not been estimated for in that way. Construction and erection are two different things. The construction is carried on by the manufacturing establishments. Part of these men's duty is to superintend erection and look after repairs. The same man does both.

Mr. SMITH. Do you not pay freight out of that appropriation?

General CROZIER. No, sir. We pay freight upon our material which comes to us for the purpose of being manufactured, but when completed the transportation is paid by the quartermaster.

Mr. SMITH. What embarassment have you suffered in the last year on the item going down from $25,000 to $5,000?

General CROZIER. Not any. We have not had any guns put in position. We may, however, require some work before July, 1907. If you will ask me a question next July, I may answer it differently.

Mr. KEIFER. What is your reasonable expectation about having something there to repair and to look after before the 1st of July, 1908?

General CROZIER. I think we will have a considerable amount before 1908. I think all the armament now provided will go into place after next year; some before next July, and all of it before the following July.

CHARGING ACCOUNTS.

Mr. SMITH. The next item is a piece of legislation, and perhaps you had better explain it, if you wish to do anything about it.

Mr. KEIFER. It is at the bottom of page 22.

General CROZIER. Yes, sir. I do not know that I can make it any plainer than it is in the note. You will understand that in conducting manufacturing operations certain expenses are general in their character, as, for instance, the pay of the foreman to supervise the manufacture of all work in a department.

Mr. KEIFER. Under one branch?

General CROZIER. Yes, sir. But when you come to a master workman, he may supervise pretty much everything you do. All foremen taken together supervise everything. Sooner or later a power plant has to operate for the purpose of manufacturing everything that is made. Also, you have to purchase wagons and other things for the use of the shop, such as oil, waste, etc. And you have to light the establishment and heat it. All those general expenses are distributed over everything that is done at the establishment.

Our method of doing that is to take from every job entered a certain percentage of the productive labor expended upon that article directly; that is to say, if we have an order for the manufacture of 25 gun carriages at the Rock Island Arsenal, there will be various machinists and blacksmiths who will be engaged on that work, and their labor will amount to so much. We take, say, 40 per cent of the cost of this labor and credit it into the general fund, and from that fund we pay expenses of heating, lighting, and power, as well as repair, which items can not be charged to any particular job. We

also charge superintendence and expenses of that sort which have to be met at every manufacturing establishment.

Now, in accordance with the theory of the Treasury Department, if I expend $25 for the repair of a boiler that is engaged in furnishing steam power for this establishment, that $25 of expenditure would have to be distributed among all the appropriations being worked under. In that way I would be compelled to have the vouchers state that so much is taken from each appropriation in paying for each separate item, and I would have to pay so much out of every one of those appropriations. You can see that that is clearly impossible. It could not be done with any reasonable clerical force. But if I credit into the general fund the same percentage of productive labor that goes into everyone of these jobs I am doing and pay these general expenses out of the fund, each one of these appropriations will bear its proper share of the general expenses exactly the same way as if I had divided them all pro rata, and the general result would be identically the same as if the other method had been used.

For instance, in the cases I have mentioned of paying the whole $25 item for the repair of a boiler out of the appropriation for making gun carriages, which may come under the head of manufacturing, and pay none out of the appropriation for manufacturing haversacks, although the sewing machines may be run from the same power, I follow the more convenient method, and it does not entail anything like so much work. My object is to pay these general expenses out of any one appropriation which is at all applicable to them, provided I follow the method which will cause all these appropriations in the long run to bear their proper ratable share, but not to compel me to divide every expenditure between all the different appropriations.

Mr. GRAFF. If you pay more than a proportionate amount, you afterwards balance it up?

General CROZIER. Yes, sir; we do that by crediting into this general fund, unless we have used the same percentage from the general appropriation. We take the percentage of the productive labor, because that has more effect than anythng on the general expenses. I do not take material into consideration. I do not credit into this fund the percentage of iron, steel, leather, or canvas that may go into the manufacture out of the fund which I have under "manufacturing."

This sheet [exhibiting] illustrates the way I do this. You will notice that there are separate headings of the different appropriations under which I am operating—armor and fortifications, arms, stores and supplies, and as many others as are in the bill. When I get an order to do a piece of work I make an allotment, and that allotment has a number, and I debit that allotment at the end of every month with the percentage of productive labor done under that allotment. That gives me the set of columns here, so that I know how much I have gotten in that appropriation. Down below I keep track of the disbursements.

Mr. KEIFER. I think we understand your object.

General CROZIER. It is always necessary to do it in this way, but it does not quite accord with the theory of the Treasury Department, and I am likely to be held up at any time in regard to it. If I buy a wheelbarrow and pay for it out of the appropriation for the work in

which it is to be used, I carry out the object, but if they knew it they would suspend my voucher.

Mr. KEIFER. They want it to work out the same way you do?

General CROZIER. Yes; it will arrive at the same result. At the end of the year we usually distribute it equitably. It is impossible to do this otherwise. When I incur this expense I prorate it according to which one of the appropriations it belongs to.

Mr. SMITH. I notice the language is, "as bears its proper share of the total amount of these expenses." That is rather vague.

General CROZIER. It is, perhaps, a little vague. But the way I would define it would be, "in accordance with its productiveness." I would apportion the different shares proportionately to the productive work done under each of such appropriations.

Mr. KEIFER. If you put in the words "proportionate" or "ratable share," it would not leave it open to the criticism of the chairman.

Mr. SMITH. It would have the same effect. I am making no criticism, but to put in "proper ratable share" would answer.

Mr. KEIFER. They might say that "proper share" was not ratable.

General CROZIER. This question of cost keeping is an interesting question. I am engaged now in an effort to make a more equitable distribution of these general expenses than is involved in the proportion of productive labor alone. I am trying to take into consideration the machine also. For if one man does at a bench $10 worth of work not using a machine, and another man alongside of him does the same amount of work and uses a $5,000 machine, I am trying to credit that general expense fund properly as to the percentage of productiveness done by these two men. According to the present rule I would credit the general fund the same amount. One man does $10 worth of work with his hands, while another man does $10 worth on a $5,000 machine. I now credit $4 to the general fund in each case. That $5,000 machine will absorb oil, waste, and power in a way that a man working at a bench will not absorb them, and therefore the general fund should bear a greater proportion with the work on the machine than in the case of the man who works with his hands. That is a change I am trying to make.

Mr. SMITH. There are only two remaining items, and on those I do not care to ask General Crozier any questions.

General CROZIER. You want this tabulated statement in regard to the balances, and I also want to clear up in my testimony the matter of the appropriation for guns, carriages, etc., for the insular possessions which was contained in the last bill. I will give you a little better information on that subject. (See note below.)

Mr. KEIFER. Or anything else which you think is important, you can summarize in your statement.

NOTE.—The guns and carriages provided for the insular possessions are as follows:

	Now provided for.	Estimate for fiscal year 1908.
15-pounders	4	8
6-inch rapid fire	13	2
10-inch rifles	3	0
12-inch rifles	6	6
14-inch rifles	0	4
12-inch mortars	4	8

THURSDAY, *December 6, 1906.*

SUBMARINE MINES AND ARTILLERY.

STATEMENTS OF BRIG. GEN. ARTHUR MURRAY AND MAJ. ERASMUS M. WEAVER, OF THE BOARD OF ORDNANCE AND FORTIFICATIONS, ACCOMPANIED BY CAPT. JOHNSON HAGOOD, ASSISTANT TO CHIEF OF ARTILLERY.

FIRE-CONTROL STATIONS AND ACCESSORIES.

Mr. SMITH. The first item which I think affects your branch of the service is the fire-control system, on page 2. You understand that, as the artillery operate and utilize the fire-control system, in general their ideas are carried out, although the construction is all done by the Engineers, the Signal Corps, and the Ordnance.

General MURRAY. I have here a statement showing exactly what part of the fire-control installation is done by each of those corps—the Engineers, the Signal Corps, and the Ordnance Department. It shows how that work is divided up among the three departments.

Mr. SMITH. This may be printed in the record.

Following is the statement referred to:

FOR FIRE-CONTROL INSTALLATIONS.

1. The Engineer Department will erect all stations (including battle and battery commander stations; primary, secondary, and supplementary stations for fire commands, mine commands, and batteries; searchlight, tide-gauge and meteorological stations, etc.), switchboard rooms, and telephone and telautograph niches and booths for emplacements and stations, all protected in the best manner practicable; it will furnish circular benches around observing instruments and plotting boards, and to reduce the noise will furnish corrugated rubber floor cloth for the floors of stations and telephone booths; it will also furnish searchlights and the electric power current required for all fire-control purposes (except that derived from Signal Corps storage batteries installed to operate telautographs), together with electric lamps and other material for lighting all stations, etc.; it will also furnish and install all wiring, underground or overhead, for lighting and power.

2. The Signal Corps will supply all instruments for communication. This will include all manner of telephones, telegraphs, telautographs, and megaphones which may from time to time be prescribed, with their primary and storage batteries, storage-battery switchboards, motor generators, boosters, and the necessary cables of all kinds required for operating and interconnecting them. It will also supply electrical clocks, time-interval bells, firing signals, zone signals, aeroscopes, field glasses, telescopes (other than battle, fire, and mine commanders' telescopes), and meteorological instruments. It will furnish and install all submarine cables for communication, including the construction of cable terminals, but excluding cover for the terminals or the cable approaches. It will also furnish all cable for communication by overhead or underground lines and the necessary terminal boxes. In case of undergound lines the cables will be placed in trenches or ducts by the Engineer Department. In case of overhead lines they will be installed by the Signal Corps. Where practicable, any pole lines which have been installed by the Engineer Department for light and power wires may, with the consent of that department, be utilized by the Signal Corps for any of these wires.

3. The Ordnance Department will supply range finders, observation telescopes, plotting boards, deflection boards, range boards, azimuth prediction boards, wind component indicators, azimuth instruments, stop watches, scale arms, materials for the construction of battle and difference charts, range tables, prediction scales, set forward rulers, drawing boards, drawing instruments, draftsman's supplies, etc., prescribed for use in connection with the fire-control and direction system for coast fortifications and for the control of mine fields.

4. The Quartermaster's Department will supply stationery, heating apparatus, oil lamps, and furniture (not including rubber floor cloth nor circular benches for observers and plotters).

Mr. SMITH. General, how many points in the United States which are fortified are lacking now in a fairly effective fire-control system, either temporary or permanent?

General MURRAY. The expression "fairly effective" is somewhat indefinite. It is not considered that a fairly effective system of fire control exists at any place that has not telephonic communication between fire-command stations and battery-command stations. Such communication exists only for those few fire and battery commands which have received the new standard equipment and for those other fire and battery commands which as yet have only the provisional equipments that are actually manned. There are 197 batteries without effective fire control out of a total of 393 batteries.

Mr. SMITH. How many batteries in the seacoast fortifications are there to which no troops are assigned at the present time?

General MURRAY. There are 125 batteries in commission and 277 out of commission; in other words, we have troops assigned to about one-third of the batteries that are now mounted, our artillery strength only allowing for this.

ARTILLERY STRENGTH OF THE UNITED STATES.

Mr. SMITH. What is the authorized strength now of the artillery branch of the service in men?

General MURRAY. Do you refer to the Coast or the Field Artillery, or both?

Mr. SMITH. Give us both first, and then separately.

General MURRAY. The authorized strength for both branches is 18,165 men.

Mr. SMITH. What is the actual strength?

General MURRAY. On October 15, 1906, it was 14,720.

Mr. SMITH. When the bills were pending at the last session the enlistments of artillery, the enrolled men, were about 4,000 short of the organized strength. Is this deficiency pretty uniform from year to year?

General MURRAY. Yes; to-day it is practically the same number as it was last year.

Mr. SMITH. This shortage is in membership in companies, and not a shortage of the companies; that is, the authorized number of companies exists.

General MURRAY. Yes, sir; it is a shortage of membership in the companies.

Mr. SMITH. And not a shortage of the companies.

General MURRAY. It is not a shortage of companies; the actual strength is about 80 per cent of the authorized strength, in round numbers.

Mr. SMITH. If the enlistments were such as to fill up the authorized strength of the artillery, would that increase the number of guns to which you assign men from the artillery?

General MURRAY. Yes, sir. Companies are assigned as units to batteries as units. The batteries have, as a rule, several guns or mortars. With the present shortage we are able to man only a part

of each battery. If the companies had their full authorized strength, more guns or mortars in each battery could be manned.

Mr. SMITH. So that you are not able to keep as many guns in commission with the artillery 4,000 short as you would if you had the full authorized enlistment?

General MURRAY. No, sir.

Mr. SMITH. What number of these men now in the artillery service are in the Coast Artillery?

General MURRAY. Fourteen thousand one hundred and fifty-three is the authorized maximum strength.

Mr. SMITH. What is the actual strength of the Coast Artillery?

General MURRAY. On October 15, 1906, it was 10,959 men.

Mr. SMITH. So that, substantially speaking, the entire shortage in the artillery branch of the service is in the Coast Artillery?

General MURRAY. No; it is a little over 3,000 short there.

Mr. SMITH. So that all but about 800 is shortage in the Coast Artillery?

General MURRAY. That is correct. In other words, the Coast Artillery is short about 3,200 men. The maximum authorized strength of the Field Artillery is 4,012 men. Its actual strength on October 15 was 3,502 men. In the Field Artillery it was then 510 men short.

Mr. SMITH. Now, to man the guns proposed to be mounted by the Taft board would take more than 50,000 men, would it not?

General MURRAY. It would take exactly 55,110 men, which includes our insular possessions, and also the Isthmus of Panama.

Mr. SMITH. How many for the continental United States?

General MURRAY. In the United States, for the defenses completed and projected by the Taft board, 47,709 men.

Mr. SMITH. Why are you 4,000 short for years in succession in enlistment in the artillery?

General MURRAY. For the simple reason that the men will not reenlist in the Coast Artillery for the pay that is given.

Mr. SMITH. Then if Congress authorized a large increase in the Coast Artillery it could not be recruited in all probability without a large increase of pay.

General MURRAY. It is thought that all of the Coast Artillery, even the increased organizations recommended, could be easily maintained at nearly the authorized strength if the pay of a comparatively few men could be increased. Our idea is that an increase of pay for the few grades we have specified will hold all of these men, and the increased opportunities for promotion to these new grades will hold many other men who now leave the artillery on expiration of their terms of service and reenlist in the infantry, where they get the same pay for less work. I believe that if we increase the expert grades in the artillery we could hold those men, and that with this higher pay in the expert grades we could bring in more men at the other end than we could hope to get eventually in this higher grade.

FIRE CONTROL AND ACCESSORIES (AGAIN).

Mr. SMITH. What is done with these guns and batteries where there are no troops assigned?

General MURRAY. They are, as we term it, put out of commission; that is, they are placed in the hands of caretakers. The guns and

their accessories are covered with cosmoline or something of that nature so as to preserve them and keep the exposed metal parts from rusting. They are worked by the caretakers from time to time to see that they are in good working order, and they are inspected frequently to see that the material does not deteriorate and that nothing goes wrong. That is all we can do for them.

Mr. SMITH. When you say "worked" you do not mean fired?

General MURRAY. No; I mean that the mechanical parts are operated to see that they function smoothly and that rust does not form so as to damage the gun. That is the duty of the caretakers.

Mr. SMITH. Now, you said that you had temporary or permanent fire-control systems established at all coast-artillery posts.

General MURRAY. There is complete fire-control equipment only at those posts which have the new standard equipment, namely, those of the artillery districts of Portland, Boston, and New York. At posts where the provisional equipment is installed only those batteries have fire-control equipment that have troops assigned to them. Only about one-half of the total number of batteries have fire-control installation.

Mr. SMITH. Do you mean to have the committee understand that you have no fire-control system, either temporary or any other kind, at the other fortifications of the United States?

General MURRAY. At posts not garrisoned and for batteries out of commission we have no effective fire control.

Mr. SMITH. Then at one-half of the batteries in the United States you have no fire control at all?

Captain HAGOOD. We have no adequate effective fire control for batteries out of commission except in the Portland, Boston, and New York districts. In those districts which have been taken up for complete installation—that is, New York, Portland, and Boston—every battery of every kind whatsoever, whether troops are assigned there or not, has a complete system.

Mr. SMITH. What I am trying to get at is this: If war should break out to-morrow, as I understand it this temporary installation, while not nearly as valuable as a permanent installation, would be still of great utility.

General MURRAY. We could fight with it, but not to best advantage.

Mr. SMITH. Do I understand that at one-half of these places where you would expect an installation that you have no fire-control system at all, temporary or otherwise?

Captain HAGOOD. No; there are one-half of the batteries that have no fire-control installation. It is desired to point out the distinction between batteries and forts or posts.

Mr. SMITH. Are you able to tell us what would be the total amount required, approximately, for the installation of fire control at all places where it has been or will be hereafter installed?

General MURRAY. As estimated by the Taft board February 27, 1906, the amount necessary to complete the fire-control installation of the whole country is $9,463,053. Since that estimate was made this amount has been reduced to $8,149,362 by subsequent appropriations and by funds that were then available, but had not been allotted at the time that the National Coast Defense Board made its estimates.

Mr. SMITH. How much has been expended upon fire control?

General MURRAY. $4,890,346.71.

Mr. SMITH. So that the amount expended or appropriated and now allotted is slightly in excess, according to your judgment, of a third of the total expense?

General MURRAY. Yes, sir.

Mr. SMITH. That is, you estimate the total expense at about $13,000,000 now?

General MURRAY. The National Coast Defense Board has estimated it, and we estimate the same thing. We accept their estimate.

Mr. SMITH. You, as a matter of fact, designed the whole fire-control system?

General MURRAY. The artillery does; yes, sir.

Mr. SMITH. And then all that is done, in fact, by these other boards in their respective spheres is to do the work——

General MURRAY. They carry out our design. They make the estimates. Each of the supply departments makes its own estimate to cover its own work.

Mr. SMITH. They did that as a basis for this fortification board's estimate?

General MURRAY. They did that in each case, and submitted their own estimates.

Mr. SMITH. Is the artillery in charge, in exactly the same way, of the fire-control systems in the insular possessions?

General MURRAY. It is.

If you will allow me, I would like to say a few words on the subject of this fire control.

Mr. KEIFER. We would be glad to hear you.

General MURRAY. I have shown that the cost of the fire-control installation of the United States to-day is $4,890,346.71. Deducting what was appropriated last year, $700,000, it will appear that we shall have expended up to that time $4,190,356.71. The question might well be asked, What has been accomplished with this expenditure? As shown by the National Coast Defense Board, there has been expended on guns and mortars $63,044,497. As you all know, the value of a gun or mortar depends upon its hitting capacity.

If you can not hit with it, it only amounts to so much iron, or possibly junk, on your hands. To show what has been done by means of this $4,190,396.71, I will say that in 1900, before we had a fire-control system established, and with what we then had—such a temporary system as we could improvise—the best record for target practice for the year, which tells, of course, the hitting capacity, on which you estimate the value of your gun, was with a 10-inch-gun battery, 50 per cent of hits at a moving target at a range of from 4,000 to 4,500 yards, at the rate of one shot in every three minutes. In the last target-practice year, with the advantage given by the newly installed fire-control system, and with the training that we have been able to give our artillerymen through the appropriations you have made for target practice, the best result obtained for that year was, in several instances, 100 per cent with the same gun, at a range of from 6,000 to 7,000 yards, at the same moving target and at the rate of one shot in forty-three seconds.

If you will figure for a moment you will see, first, that as to the time of shots the rate of hits that we made in 1900 was one hit in six minutes. In 1905 we made one hit in forty-three seconds, or about eight times as many hits in the same time. And you will also see that

the range has approximately been doubled. The danger space at 7,000 yards, we will say, is about one-half of what it is at 4,000 yards; so we have doubled again the accuracy. If then we consider the number of shots, the time, the range, and the fact that the cost of the guns was about $60,000,000, we will find that through the expenditure of this $4,190,000 we have multiplied the value of our guns about thirtyfold. In other words, the only way without the range-finding system to get that result would have been to put in 30 guns where we now have 1. I have given this to illustrate the value of our fire-control system and its economy as compared with the multiplication of guns.

Mr. SMITH. There is only one matter in your statement that I do not myself understand. The committee has had a great many hearings on this fire-control system in years gone by, and some quite elaborate ones. But I do not understand in what way the fire control increases the speed of firing. We do, however, I think, understand how it improves the accuracy.

Major WEAVER. You must make a distinction between fire direction and fire control.

Mr. SMITH. We understand that fire control is a broader term.

Major WEAVER. Fire control is a function pertaining to the higher officers—the fire commander—it has to do with the selection of targets for attack and with the concentration and dispersion of the fire of the coast-defense guns and mortars. Fire direction is a function of battery commanders. When a target has once been assigned by a fire commander to a battery commander, the latter must keep his guns on it and fire at it as many times as he can. This is fire direction. Fire control is a matter of selection and judgment; fire direction is one of execution, of hitting the target as many times and as rapidly as possible. Our system of fire direction involves a very accurate system of range finding. This includes observation stations at the end of a long base line, with a telescope at each end of the line. Observations are made every twenty seconds.

The angles of the target from the base line, as observed from each observing station, are telephoned to men at a plotting board. The triangle made by the target and the ends of the base line as verities is solved mechanically at the plotting board, and the range of the target from the gun thereby determined. This system accomplishes the fixing of the position of the target on the plotting board once every twenty seconds, measuring the ranges on the board, and telephoning this range out to the guns.

Mr. SMITH. But your statement does not seem to make it clear to us how it fires the gun oftener. Make that plain, please.

Major WEAVER. I will do that. Take this situation as an illustration: Suppose one detachment of men is at the gun and another is at the plotting board. The latter is charged with determining the range accurately once every twenty seconds, as explained. This act of fixing the position of the target every twenty seconds, measuring the range, and telephoning the range to the gun goes right on continuously regardless of the work at the guns; the correct range is thus sent to the guns every twenty seconds and it is posted there for the information of the gun pointers.

Now, the men at the guns are charged simply with loading the gun as rapidly as possible. The gun pointer notes constantly the

range as posted and keeps the gun pointed at all times, even during the loading. As soon as the gun is loaded it is fired. It will be seen that posting the correct range every twenty seconds enables the pointer to keep the gun constantly pointed and reduces the firing interval practically to the loading interval; the gun can be fired as rapidly as it can be loaded, because it is kept pointed all the time. The fire-direction equipment makes this continuous pointing possible, and this continuous pointing, in turn, makes the rapid firing possible.

Now, under the old system there was not that independence between the range-finding operation and the gun-firing operation. The gun firing waited on the range finding—that is, the range was determined slowly and not continuously, but separately for each round fired. The men at the gun waited for the range before firing each time, and that was a slow process. But when the range is determined continuously, and we make that complete differentiation between the range finding and the work on the gun platform, then the gun, if it were loaded in half a second, would find posted and ready for it the corrected range and could be fired instantly.

Mr. SMITH. Do you mean to tell us that prior to the establishment of the fire control the range was obtained by a system of triangulation?

Major WEAVER. Yes, sir; we simply had an ordinary transit instrument, a surveyor's transit at each end of a base line, which we measured off roughly on the beach. The observers read the angles to the target, signaled these angles by flags to the plotting board, plotted the target's position, measured the distance on the plotting board from the gun to the target, and information of the range was sent by messenger to the gun.

Mr. SMITH. How long had that system been in operation?

Major WEAVER. From the latter part of the eighties, although I am not exactly sure as to the time. I do not believe we had anything different up to about 1898. We did not have it for the Spanish war.

Mr. SMITH. I am aware of that. This is the first time it has been intimated since I have been on this subcommittee that prior to the establishment of substantially the modern fire-control system you ascertained the range, or anything else, by triangulation.

Major WEAVER. Oh, certainly we did, before that, even as far back as when we had the muzzle-loading guns.

Mr. SMITH. It was said that practically there had been no improvement down to the discovery of the range finder.

Major WEAVER. You must understand that the system has always been the solution of a triangle to determine the range. All range finders are merely mechanical appliances for solving triangles. The simple combination I have described is, in fact, a range finder. The apparatus and the equipment that has been supplied by your appropriations during recent years has served simply to expedite the mechanical solution of the range triangle and to reduce the time of determining the correct range. This has been, in fact, the evolution of the fire-control system.

Mr. SMITH. When do you say they first commenced to take this triangulation by mechanical means rather than the human eye?

Major WEAVER. In the early eighties; even before that a plane table method was used.

Mr. SMITH. That is the first information ever given to this committee that artificial means was used at all until the introduction of the modern range finder.

Major WEAVER. It was a simple system; measuring off a base line on the beach, ascertaining the angles with a surveyor's transit, and plotting these on an ordinary plotting board or plane table.

General MURRAY. We can go back to a date when they used a plane table.

Major WEAVER. We have always determined range mechanically since I have been in the service—since 1875.

Captain HAGOOD. Mathematical tables were used to correct the range and to get the elevation to give the gun in firing.

Major WEAVER. The whole question has been to reduce the time of the solution of the triangle. Formerly it took us from five to six minutes to solve the triangle, and now we do it in twenty seconds, or even ten seconds.

There is one other point that probably ought to be made clear, and that is that a ship can not change either its rate or direction in twenty seconds, if it has any headway at all, so that we can with perfect confidence assume that its speed will be uniform and its direction constant for that length of time. Therefore, we do not determine the range of the target for the instant of firing, but its range twenty seconds ahead, so that the information that is sent down to the gun is always for an instant ten or fifteen seconds in advance; that is, the gun pointer is kept informed as to what the range of his target will be a few seconds ahead.

Mr. KEIFER. The firing is with reference to the time the ball would reach that point?

Major WEAVER. Yes. The ship goes along practically uniformly for the few seconds, and we can confidently predict that it will be there at that time. We shoot the gun so that the projectile will meet the ship at that point.

Mr. SMITH. This matter has been made plain to the committee as to the present mode of operating the fire-control system, but the progress which had been made prior to the modern appropriations for fire control had never been explained before this committee within the last four years; in fact, it was stated here at one time, and of course probably having in mind a date long anterior, that there was practically no artificial means of aiming these guns until the discovery of this fire-control system.

Mr. KEIFER. That must have been misunderstood in the use of terms. The development of the mode of recording and communicating the range so that the men at the gun could always tell what it should be, is perhaps new, is it not? The men firing the guns some years ago could not find that out without waiting.

General MURRAY. No; but now he has it all the time.

Major WEAVER. With the present methods a gun is fired with accurate pointing the instant it is loaded, however short be the time of loading. The whole principle is that a loaded gun should not be held up one single instant waiting for range; that is the fundamental principle upon which we work.

General MURRAY. The point that I want to make is that we have developed enormously the value of our guns through the fire-control and fire-direction material and instruments you have given us.

I think you asked me a question as to whether the shortage of men did not decrease the number of guns in commission. I stated that it did not decrease the number of guns, but does decrease the number of batteries, each company organization being assigned to a battery. I desire to correct this statement. A shortage of men does decrease the number of guns in commission, because it makes it impossible to keep all of the guns in a given battery in commission. To illustrate, a company may be assigned three 12-inch guns; if there be a shortage it might be possible to actually man only two or even one of the three guns in the battery.

Mr. KEIFER. In other words, they may be assigned, but not used.

General MURRAY. In some cases the organization may be only able to man one out of the three guns assigned to it.

Mr. KEIFER. But they are assigned just the same.

General MURRAY. They are assigned to a given battery.

Mr. KEIFER. What do you call a battery? We understand a battery to be four guns ordinarily.

General MURRAY. Seacoast guns are placed in groups, sometimes single, but ordinarily two in a group. Occasionally there are three or four, and sometimes five. The term "battery" usually designates a group of guns of the same caliber, which, for the big guns, ordinarily consists of two guns. We assign a company to a battery. As the batteries vary in size, it has been found to be necessary to recommend that the size of the company of coast artillery be made variable in size.

Mr. KEIFER. In speaking of field batteries, assigned to support cavalry and infantry, we understand them to be four-gun batteries.

General MURRAY. Yes; at the present time. In 1901, when the present reorganization act of the artillery was passed, the field-gun battery then consisted of six guns. It has been reduced since to four guns per battery, due to the rapidity of fire of the guns, the difficulty of supplying ammunition and of controlling the fire.

Mr. KEIFER. That does not apply to coast artillery?

General MURRAY. No.

Mr. BRUNDIDGE. In the event of war, how long would it take to install temporary fire control at places where you have no batteries?

General MURRAY. I would have to make an estimate as to how long it would take us to get the requisite range-finding and other instruments. It is a question of what type of temporary fire-control system would be installed.

Mr. BRUNDIDGE. I understood you to state that you already had temporary installations at some of the places. Now, of such as you have, and which you say would be very useful, how long would it take you to install that at places where you now have none at all? You can give me your answer approximately.

General MURRAY. I can only estimate as to the time it would take to get them, and I will have to give you the best estimate I can. I would say that even if we had an emergency fund or unlimited means to go out into the market and get them, it would take us anywhere from six months to a year to get the requisite instruments and install a serviceable fire-control system everywhere.

Mr. BRUNDIDGE. You say "everywhere;" at all points?

General MURRAY. At all places needed, as your question indicated.

Mr. GRAFF. What proportion are now provided with temporary or permanent fire control?

General MURRAY. There are 197 batteries without fire control out of a total of 393 batteries.

Mr. SMITH. All that are in commission?

General MURRAY. All that we have men to man, and 71 not manned in the artillery districts of Portland, Boston, and New York, in which districts the standard equipment has been installed.

Mr. GRAFF. These companies are operated independently as companies just the same, even though they be not full.

General MURRAY. A company is assigned to a battery, and it mans and serves as much of the battery as it can. It mans only one gun, if it has men enough only to do that; and if it has enough men, it mans three. If it has men enough to man one only, the other guns of the battery are put out of commission.

DESERTIONS AND REENLISTMENTS.

Mr. KEIFER. Are desertions going on now from these companies that are assigned, rapidly?

General MURRAY. I have not as good information on that subject as I should have, but I could get it from The Military Secretary. There is desertion going on at all times.

Mr. KEIFER. I know that; but rapidly?

General MURRAY. I do not believe that we begin to suffer as much from desertions, even approximately so, as we do from failure to reenlist. The report of the Military Secretary for the past year shows that in the entire Army there is about 35 per cent of reenlistment, which includes all branches of the service. I have within the last day or two asked him to give me the exact figures with regard to the enlistment and reenlistment in the artillery, with a view to making a comparison between that for the whole Army and that in the artillery. These figures have just been given to me. They show 23 per cent of reenlistments in the artillery and 43 per cent in the infantry. The Engineer Corps, which is charged with duties of a special nature, and the men of which perform their special duties as well as those of regular infantry, like the Coast Artillery does, have 60 per cent of reenlistments. The engineer troops get higher pay for their special work. This goes to show that if coast artillery troops be given higher pay for their special work the per cent of reenlistments would be much higher.

Mr. KEIFER. Isn't it less in the Coast Artillery than in the Field?

General MURRAY. They are practically the same.

DETERIORATION OF SEACOAST GUNS, EMPLACEMENTS, CARRIAGES, AND APPARATUS.

Mr. SMITH. I would like to know what is, in your judgment, the relative deterioration from all causes of the seacoast guns, emplacements, carriages and everything, that are out of commission, and those that are in commission.

General MURRAY. So far as I can see, they ought to be kept practically in the same relative condition, the same condition at all times—that is, if our caretakers do their work properly.

Mr. SMTHI. The guns in commission are fired from time to time; and unless there is some depreciation from nonuse, those guns that are not fired ought to be in better condition than those that are manned.

General MURRAY. To that extent, yes.

Mr. SMITH. Every time you fire one of these large guns you not only injure the gun, but to some extent you are apt to injure the emplacement.

General MURRAY. Slightly.

Mr. SMITH. Has not the War Department been given a large appropriation every year because these modern guns of high charges destroy the cement work of the emplacement, and that they have to be constantly repaired?

General MURRAY. Undoubtedly they are, but I do not know the exact amount of that, and I can not tell.

Mr. SMITH. What I am trying to get at is this: Any new construction that we put in, as long as you are unable to enlist men up to your present organization strength, means new construction put out of commission, practically, does it not; excepting as to the fire control and things of that kind?

General MURRAY. Yes, sir.

Mr. SMITH. What I wanted to know was whether, as a matter of fact, any material deterioration in these emplacements, guns and carriages, and the entire equipment of a seacoast fortification, took place when it is out of commission?

Major WEAVER. There is undoubtedly deterioration in the electrical instruments installed in the damp rooms of the batteries.

Mr. SMITH. Is there any considerable electrical installation in any of these places out of commission?

Major WEAVER. Yes; the ammunition hoists and electric-light plants.

Captain HAGOOD. In those districts where we have just put in this fire-control system—that is, the standard installation for the first time—we have had some complaint that the clocks, the range finders, and fine instruments of that kind, at points where troops have not been assigned, have been deteriorating.

General MURRAY. That relates to fire-control installation rather than the guns and emplacements, which you were asking about; and, as I stated in the beginning, there is no reason why there should be more deterioration than in the other guns, providing the care takers do their work properly.

Mr. SMITH. Would it be possible to buy electrical equipment and not install it, thus preserving it from deterioration; and I am now referring to the clocks and the other things that you spoke of.

General MURRAY. Do you mean to put it in storage?

Mr. SMITH. Yes.

General MURRAY. I should say yes, without any question. That would, of course, help us in an emergency.

Captain HAGOOD. That question has been discussed in the office already, as to whether or not when we put in the permanent installation we should not take the range finders, and other things of that nature, and instead of putting them in the stations place them in storage ready to put in. Of course, if they were not on hand it would

take a year or a year and a half to manufacture them and get them ready.

General MURRAY. In other words, install only where you have men and guns in commission. The whole point with regard to putting in the fire-control installation, or having it on hand and putting it in at a given place, is the training of our people. We have got to have trained men, and it is a question of how many men we should have on hand in order to meet emergencies.

Mr. SMITH. This committee of course has nothing to do with that. What we are trying to get at is, knowing that you are unable to get men, how far we should go ahead and appropriate money to establish the system at places not in commission.

General MURRAY. I should say stop new gun construction for this country until we have brought up all accessories in line with our gun and mortar construction, with the exception of the entrance to Chesapeake Bay. I think the defenses at this point should be constructed as soon as possible.

Mr. SMITH. Commonly known as the Cape Henry project.

Mr. KEIFER. You are in favor of that?

General MURRAY. I think without any question that should be put in.

Mr. KEIFER. Do you think if that was well protected there that it would dispense with expenditures of money inside, altogether or largely?

General MURRAY. If protected sufficiently to absolutely bar the entrance, of course it would.

Mr. KEIFER. Can not that be done?

General MURRAY. It is within the bounds of possibility.

Major WEAVER. It involves building an island there.

Mr. SMITH. Is it regarded as wise in such cases to abandon the other lines of defense, so that in case of breakage you have nothing?

Major WEAVER. The interior fortifications will always be needed to close Hampton Roads and to protect the navy-yard at Portsmouth and the shipyard at Newport News.

Mr. KEIFER. We have a long line of interior fortifications inside of Cape Henry and up to Baltimore.

General MURRAY. I would think that even though we had an almost invulnerable line at the Capes that it would not be wise to abandon, for instance, the fortifications which cover Washington, the Portsmouth Navy-Yard, or Baltimore, for the reason that though we may have it practically impassable something may go wrong.

General MURRAY. Of course it would reduce the importance of the interior works if you have a strong outer line of defenses.

PURCHASE AND INSTALLATION OF SEARCHLIGHTS.

Do you want me to touch on the subject of searchlights?

Mr. SMITH. It has not been covered at this hearing.

Mr. KEIFER. The estimate is for $500,000. We appropriate $125,000 last year. I think it might be well to understand whether there is any special reason why the appropriation of last year should be increased.

General MURRAY. In regard to that I would say that the National Coast Defense Board estimated that the cost of searchlights necessary for the United States for guns alone would be $2,897,000. That

amount has been reduced by the appropriation of $125,000 last year, leaving $2,772,000 for the cost of searchlights yet to be bought. The estimate for this year is $500,000, which would still leave $2,272,000 to be appropriated in the future for the number of lights estimated for by the National Coast Defense Board for the gun defense alone of the United States.

Mr. KEIFER. Are searchlights being placed in important harbors now?

General MURRAY. As fast as we can get the lights we distribute them among the different posts that we have garrisoned for use at night drill. Night drill is the most important drill we have. All naval attacks practically would be made at night, and we must depend at night on the searchlight and the mine defenses.

Mr. KEIFER. You can have no drill or instruction at all without searchlights at night?

General MURRAY. We can have none; there is no possibility of having any. The searchlight is an absolute necessity for the proper training of coast-defense troops in the service of coast guns, mortars, and mines at night.

Mr. SMITH. I would like to call attention to one or two matters further in connection with that. As a matter of fact, substantially every harbor in the United States has one or more searchlights now.

General MURRAY. I can give you the exact number of searchlights we have to-day, and, if you desire, exactly where they are placed. What you state is correct. There are one or more searchlights at many coast forts, but many of them are of such inferior power as to be practically of no value for the purposes of night drill.

Mr. SMITH. At this point I would like to put in the record a portion of the testimony of Major Abbot in the hearing of a year ago. [Reads:]

New York, Boston, Portland, Narragansett Bay, and the eastern entrance of Long Island Sound have been supplied with a considerable number of searchlights each, but the rest of the searchlights have been distributed widely over the United States coasts to give a chance to the artillery to drill at night. Searchlight money has been distributed in small amounts to almost all the harbors, so that there is hardly more than two or three forts that have not one searchlight, thus permitting the guns to be drilled with at night.

General MURRAY. With regard to the statement as to the posts, that is correct; there are but few posts that have no searchlights. I would call attention, however, to the fact that many of those searchlights are of such small size and low power as to be useless for artillery purposes. Eighteen are 24-inch lights and 29 are 30-inch lights. The experience of the joint army and navy maneuvers goes to show that no light should be less than a 36-inch light. For full range work nothing less than 60-inch lights should be supplied.

Major WEAVER. The ranges at which the smaller lights will pick up a target are so short that we can not carry on our drill under the conditions that we would have to fight.

General MURRAY. Not even approximately so. The range for the 24 and the 30 inch lights under the best of conditions I do not think would run over 3,500 yards, and ordinarily would be considerably within that.

Major WEAVER. The recommendations of the joint army and navy

board of review and of the National Coast Defense Board have been for 60-inch lights.

General MURRAY. The National Coast Defense Board has recommended, for home ports, 136 60-inch lights and 65 36-inch lights.

Major WEAVER. Nothing less than 36-inch.

General MURRAY. So that though we have a number of searchlights at these places, they are too small and of too limited capacity for the work required. There are on hand in Boston Harbor to-day two 24-inch lights and one 36-inch light. There are required for the Boston Harbor fire-control scheme, one light for each battery commander and one illuminating light to each fire commander—four battery-commander lights and eleven illuminating lights. I doubt if there are any of the lights there. All of the battery commanders' lights should be 60-inch lights, and the majority of the fire-commanders' lights should be 60-inch lights.

Mr. SMITH. What fortifications in the United States are equipped with no lights of 36 inches or more—that is, what fortifications have exclusively lights below 36-inch?

General MURRAY. Fort Strong, Boston Harbor——

Mr. SMITH. But there are other fortifications in Boston Harbor besides Fort Strong.

General MURRAY. Yes; there are seven forts in there besides Fort Strong. Take Fort Greble, in Narragansett Bay; also Fort Wetherill. I could have gone back and got a lot of them. Let me begin at the beginning and give you the forts in the United States which have no 36-inch or larger lights.

Mr. KEIFER. That will be the best way.

Mr. SMITH. If you will do that we shall be glad, and further, give the name of the harbor as well as the fort as you go down, and also state if there are other forts in that same harbor that have 36-inch or more lights.

General MURRAY. Very well. In Portland Harbor there are four posts or forts—McKinley, Levett, Preble, and Williams—each of which has a 36-inch light or a 60-inch light. There are no other forts in that harbor.

Mr. SMITH. Is that Portland, Me.?

General MURRAY. Yes, sir. At Portsmouth, N. H., there are Fort Constitution, Fort Stark, and Fort Foster—three forts—none of which has any lights.

In Boston Harbor there are Forts Heath, Banks, Strong, Standish, Warren, Andrews, and Revere, only one of which—Warren—has a 36-inch light. Forts Heath, Banks, Standish, Andrews, and Revere have none.

At New Bedford Harbor there is one fort—Rodman—which has one 36-inch light. In Narragansett Bay there are five forts—Adams, Wetherill, Greble, Getty, and Phil Kearney; of which Adams alone has one 36-inch light. The other forts named have no lights.

In the New London district there are four forts—H. G. Wright, Michie, Terry, and Mansfield. Fort Wright has three 36-inch lights; Michie one, Terry one. Each of the other three forts has lights of lesser diameter.

In eastern New York there are three forts—Totten, Schuyler, and Slocum. All three have 60-inch lights. Totten, in addition, has one

36-inch. In southern New York there are three forts—Hamilton, Wadsworth, and Hancock—all three of which have 60-inch lights. Hamilton and Hancock have, in addition, one 36-inch light each.

In the district of Delaware there are three forts—Dupont, Mott, and Delaware. None of these has a light of 36 or 60 inch caliber.

In the district of Baltimore there are four forts—Howard, Smallwood, Carroll, and Armistead. Howard has two 36-inch lights, and Smallwood and Armistead each have a 36-inch light.

In the district of Washington there are two forts—Washington and Hunt—each of which has a 60-inch light. In the artillery district of the Chesapeake there are two forts—Monroe and Wool. At Monroe there are two 60-inch lights and three 36-inch lights. At Wool there is one 60-inch.

The district of Charleston comprises two harbors, one at the mouth of Cape Fear River, where Fort Caswell is located, which has one 36-inch light, and the other in Charleston Harbor, at Fort Moultrie, which has no light of 36-inch power or greater. The district of Savannah embraces the forts Screven and Fremont. Fremont has been dropped out of the coast-defense system by the Taft board.

There is one 36-inch light there, which, of course, will be transferred elsewhere. There is no 36-inch or larger light at Screven.

In the district of Key West, which embraces Fort Taylor, at Key West, and Dade and De Soto, in Tampa Bay, there is no light of 36-inch size or larger.

In the district of Pensacola, which embraces both Pensacola Harbor and Mobile Harbor, there are five forts—Barrancas, Pickens, McRee, Morgan, and Gaines. In the Pensacola Harbor there is only one, at McRee, a 36-inch light. Three of the forts have no lights.

In the New Orleans district there are two forts. There are no lights of 36-inch size or larger.

In the San Diego, Cal., district there is no light of 36-inch size or larger.

In San Francisco Harbor there are five forts—Miley, Presidio, Mason, Baker, and Barry—and in the harbor there is only one 36-inch light, three of the forts—Miley, Mason, and Barry—having no lights.

At Columbia River, Oregon, there are two forts—Stevens and Columbia—and they have no light of 36-inch size or larger.

Puget Sound has four forts—Worden, Flagler, Casey, and Ward. Worden has one 36-inch light. There are no other lights of 36-inch or larger in the district. The total number of searchlights of all sizes in the United States is as follows: Eighteen 24-inch, twenty-nine 30-inch, twenty-four 36-inch, and fourteen 60-inch lights.

Mr. SMITH. Now, how long have you been installing 60-inch lights at all?

General MURRAY. The first was used at the maneuvers in 1902.

Mr. SMITH. Since that time a million dollars has been appropriated for searchlights. Have you in that time continued to buy the 36-inch and smaller lights—I mean the Department, not you personally—with that money?

General MURRAY. I can not say exactly when they stopped buying the smaller lights. I think, however, since that date no light less than 36-inch has been bought.

Mr. SMITH. Practically all the harbors, not ordinary forts, have 36-inch lights now, according to the statement which I have hastily considered as you read it to me?

General MURRAY. Having one per harbor would mean nothing to the other forts.

Mr. SMITH. It would not be adequate, but it would not be nothing.

General MURRAY. Possibly it would be more than nothing, but very little more.

Mr. SMITH. Suppose that a light was cast upon a vessel entering a harbor. If that could be seen from more than one fort, it would be possible to take the range from more than one fort, would it not?

General MURRAY. It would depend on how the lights fell on the vessel and the nature of the instrument you had for determining the range.

Major WEAVER. Of course a naval attack would never be made by one vessel alone in a first-class harbor. If we could be assured that our forts would be attacked by only one ship, we would need only one searchlight.

Mr. SMITH. I appreciate the need for more than one searchlight for getting the fire upon more than one vessel, but I am asking now if the searchlight were thrown on more than one vessel whether it would be of utility to more than one of the forts?

General MURRAY. It depends, as I said, on how the lights are on the vessel and the nature of the instruments you have.

Mr. SMITH. Suppose you had the modern appliances complete?

General MURRAY. We must have it in such a way that we can see our water line, provided we use the range-finding system.

Major WEAVER. If a ship enter between two forts and the source of light is on one side, it will be of no service to the fort on the other side.

Mr. SMITH. I asked you whether it was not possible in many cases for the light to reveal the ship to more than one fort in the same harbor. Would not a wise distribution of lights take into consideration the view from the various forts in the harbor? That is, to illustrate in a concrete way, suppose you had forts upon the right and left of the harbor; would it not be wise to put lights on the right and left, rather than to concentrate them upon the right alone?

Major WEAVER. Undoubtedly. In all cases the best distribution of lights is made a study for each locality.

Mr. SMITH. We are seeking information on that.

Mr. KEIFER. I want to ask about the distance at which you could use the 36-inch light.

General MURRAY. In the most favorable weather conditions, in round numbers, from five to six thousand yards; possibly from 5,000 to 7,000 yards.

Major WEAVER. You are speaking of large ships, and not torpedo boats or small craft.

General MURRAY. That is speaking of large ships. I would say the 36-inch light, under the best conditions, could be used at ranges from five to seven thousand yards.

Mr. KEIFER. Now as to the 60-inch?

General MURRAY. As to the 60-inch, I should say from ten to twelve thousand yards.

Major WEAVER. May I state a fact that I observed in the maneuvers of 1903? The ships of the fleet were picked up from Whitehead, on Cushing Island, at a range beyond 12,000 yards.

General MURRAY. Yes. I myself was looking through this and saw it at the same instant. It was a 60-inch light. The distance was nearly 13,000 yards. It was under somewhat extraordinarily good conditions.

Mr. KEIFER. Now let us go to the 30-inch light. What do you say as to that?

General MURRAY. The 30-inch, I should say, as a maximum was not over 4,000 yards, and it is seldom that you can get 2,500 yards.

Mr. KEIFER. Now as to the 24-inch.

General MURRAY. The normal ranges of a 24-inch will not exceed 1,500 yards to 3,000 yards, and you can seldom get 2,000 yards.

Mr. KEIFER. From a mile to two miles?

General MURRAY. It would be far within the outermost range at which we could do effective firing. The enemy would be right on top of us before we could discover his presence.

Mr. BRUNDIDGE. If that is true, why were so many inferior lights installed? When did the Department understand the great benefit of the higher lights?

General MURRAY. Not until we began our maneuvers and began our practice.

Major WEAVER. The necessity for the larger lights has been determined by the experience of the joint operations of the Army and Navy.

Mr. BRUNDIDGE. I want to get the time of the discovery.

General MURRAY. It was in 1902, when we had our maneuvers. We had maneuvers in 1902, 1903, and 1905. We then saw the necessity of having lights of greater diameter.

Mr. SMITH. Your present scheme provides for a number of 36-inch lights?

General MURRAY. If there is a narrow channel a 36-inch light may be sufficient.

Mr. SMITH. Your present scheme now involves the having of a large number of 36-inch lights, does it?

General MURRAY. Sixty-five of them, as against 136 of the 60-inch lights.

Mr. SMITH. Now, I want to know, of this million dollars that we have given you since 1902, how much has been put into the 60-inch light, if you can tell us? How much does the ordinary installation of the 60-inch light cost?

General MURRAY. The Taft board estimated one 60-inch light at $17,000 and the 36-inch light at $9,000.

Mr. SMITH. Now, you ask $17,000, and how many do you say you have now of the 60-inch lights?

General MURRAY. Fourteen.

Mr. SMITH. That would make $238,000.

General MURRAY. We have twenty-four 36-inch lights.

Mr. SMITH. So that with a million dollars, or about that, that has been appropriated in 1902 and since, substantially three-fourths of it has not been spent for 60-inch lights?

General MURRAY. Only fourteen 60-inch lights have been purchased, but there are under contract to be forwarded 30 more of 36-

inch lights. With the $125,000 appropriated last year it is proposed to purchase eight sixties.

Mr. SMITH. So that the 36-inch lights are not so far behind the times but that you are buying them in large quantities right up to the present time?

Mr. KEIFER. In many respects they are quite sufficient in some places?

General MURRAY. Yes, sir.

Major WEAVER. This depends upon what effective range is offered at any given locality.

Mr. SMITH. Now, shall we pass to page 12, General? Is there anything before page 12 that you wish to be heard on?

CONSTRUCTION OF MINING CASEMATES, CABLE GALLERIES, AND OTHER STRUCTURES.

General MURRAY. I do not know whether you talked over the subject of submarine-mine structures or not. That is on page 6 and page 7.

Mr. SMITH. I supposed that was a matter the engineers only would know the cost of, and that you would have to get your figures from them. Would you not?

General MURRAY. I have to get figures from them as to the cost, but I have to show them and the committee what we want and why this $350,000 is asked for.

Mr. KEIFER. What $350,000?

General MURRAY. On top of page 7.

Mr. SMITH. And at the bottom of page 6.

General MURRAY. On the blueprint which I now submit to you [submitting same] we have the estimates for submarine mine material for mine structures, buildings, etc., for the equipment of ports of the United States. If you will examine that sheet you will see that it includes work from the four Departments—the Engineering Department, the Signaling Department, the Quartermaster's Department, and the Ordnance Department. The Engineers build the mine structures. In the sheet that you have before you the blank spaces show where the buildings have been completed, or where sufficient money has been allotted to complete them. The figures show buildings yet to be appropriated for.

If we take the total of that pertaining to the Engineer Department you will find that that is $1,352,819 for completing all mine structures at all posts in the United States. This year $350,000 is asked by the Engineers, which would still leave, if that amount is appropriated, $1,000,000 yet to be appropriated. From the appropriations that have been made heretofore we have finished our construction work at places on the Atlantic coast as far as possible, as can be seen from an examination of the sheet. If this $350,000 is appropriated we will go as far as we can toward completing the submarine mining structures at the other important points, especially in so far as the mine buildings are concerned. This year an allotment was made for all that was required at San Francisco, but after the earthquake and the resulting fire, and because of the conditions out there, the money that was allotted was transferred for use at points on the east coast.

Mr. KEIFER. And so you did nothing out there?

General MURRAY. We did nothing there, because we found it would be too expensive just now to build at San Francisco. Of course, it is a question of doing the best we can in the different harbors.

STATUS OF SUBMARINE DEFENSE.

Mr. SMITH. I suppose, General, you are familiar with the conflicting reports that have been made to this committee as to the state of the submarine defense?

General MURRAY. I believe so; I believe you called my attention to that about three years ago.

Mr. SMITH. About that time you estimated that $4,000,000 would about complete the entire submarine defense of the United States, when that was called to your attention, did you not?

General MURRAY. Yes, sir.

Mr. SMITH. What is your estimate now as to the total cost, not to finish, but of the work from that time? There has been considerable increase, has there not?

General MURRAY. It was increased by the National Coast Defense Board by the addition at each post of from $3,000 to $12,000 to supply power for the mine searchlights. With that exception there has been practically no increase in the estimate since I gave it to you three years ago.

Mr. SMITH. As I understand, you estimate the total balance to be appropriated at $3,652,993?

General MURRAY. The balance to be appropriated is $3,456,322.

Mr. SMITH. Now, under this item for three years alone we have given you about $660,000, besides the money appropriated for ordnance; so that if this balance were allowed, it would run far in excess of $4,000,000, would it not?

General MURRAY. In my statement a moment ago I said that the statement I gave you three years ago was practically the same, or had been simply increased by the National Coast Defense Board by the addition of from $3,000 to $12,000 for each post for power and searchlight. I may possibly be mistaken in the statement in regard to the first increase of that estimate that I gave you. The first estimate which I submitted to the Board, and which I brought in here, was made by sending all around the country and getting the best data we could from commanding officers. The effort was made to estimate what was needed to complete the submarine defenses at each place, according to the standard laid down in the old Engineers' Torpedo Manual. When that data was received the first estimate was based on it.

I afterwards went around and visited personally every post in the United States as a member of the Board, composed of the district engineer officer in the district and the artillery officer in charge of the submarine-mine work in the different districts. We then jointly estimated anew the work and the amount at each place necessary to complete it. After we had completed this second estimate in this way we found it to be slightly greater than the first one. The second estimate is one that the National Coast Defense Board accepted. The estimate for cost of buildings was made by the district engineer officers themselves. Power and searchlight items were added to these estimates by the National Coast Defense Board, as already stated. The

estimate I first made amounted to $3,819,420, the second one to $3,786,448, the National Coast Defense Board estimate to $3,889,993.

Mr. SMITH. I am not asking for that.

General MURRAY. There has been no material difference.

Mr. SMITH. It is only a million dollars.

General MURRAY. No; nothing approximating that.

Mr. SMITH. We have given you $1,362,000 in the last three years.

Mr. KEIFER. Where does that appear, Mr. Chairman?

Mr. SMITH. One million dollars of it appears under the head of "Submarine mines," on page 17 of the bill. Under this item, at the bottom of page 6, we have given $662,000 in the last three years.

General MURRAY. That would make $4,800,000.

Mr. SMITH. Something over $4,800,000.

General MURRAY. I could give you the exact figures if I went back.

Mr. SMITH. I understand. It is due to the subsequent examination more in detail?

General MURRAY. Yes; and better than possibly could have been done at the time I was here before you the first time.

Mr. SMITH. The estimates do not shrink, and we appropriate the money.

General MURRAY. The first estimates were made by the artillery officers, and they had to guess at the construction of the engineering buildings and other things. The second time the engineer officer in every instance made his own estimate, and those we accepted.

Mr. SMITH. Are you interested at all in this item on page 6 for the erection of structures for the torpedo defense of the United States?

General MURRAY. I am interested, certainly, in keeping the buildings in repair.

Mr. SMITH. It says here, in the note signed by General Mackenzie, that the appropriations for the purpose have amounted to $1,953,000. That includes the appropriation for buildings erected for the torpedo defense while under the charge of the engineers, I take it?

General MURRAY. The appropriations made to-day for torpedo structures?

Mr. SMITH. Yes; that includes any expenses incurred prior to the time when the artillery had charge of the coast defenses?

General MURRAY. It includes all up to that time.

Mr. SMITH. All I wanted to get into the record was whether this was an appropriation for the repair of new structures since the turning over of this to the artillery or whether it long antedates that and includes some old buildings or structures.

General MURRAY. It includes some old structures. When we made out our estimate of our work, wherever possible we made use of old structures, and the cost of them would be included here.

PURCHASE OF SEARCHLIGHT OUTFITS FOR SUBMARINE MINES.

Mr. SMITH. Passing again to the next item, on which we were a while ago, you ask new language there, "and the purchase of searchlight outfits for submarine mines." By "searchlight outfits" I presume you mean to include the searchlights themselves, I take it.

General MURRAY. Searchlights for mines.

Mr. SMITH. To what extent have you searchlights, and where did you get them? Out of what appropriation did you get them for this purpose?

General MURRAY. To the best of my recollection we have bought no mine searchlights since the torpedo work was turned over to the artillery. At the time that this was turned over there were a few—I should not say more than half a dozen—of the smaller lights turned over by the engineers to us. I could give the exact figures, of course, by going back in the records.

Mr. SMITH. When you come to revise your notes, General, I would be glad if you would state positively whether you have acquired any searchlights since receiving these from the engineers; and if so, what did you pay for them?

General MURRAY. I am confident that we have not bought any searchlights for mine purposes; that all the searchlights that have been turned over to us in the last few years have been turned over from the appropriation made directly for searchlights, and were bought by the engineers.

After investigation I find that the views expressed above are accurate. No searchlights have been purchased from appropriations for the construction of mining casemates, cable galleries, storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories, and the purchase of searchlight outfits for submarine mines.

Mr. SMITH. Under what reasoning do you reach the conclusion that the searchlights for submarine mines should not be bought out of the appropriation on page 4, under that language, "For purchase and installation of searchlights for the defenses of our most important harbors?"

General MURRAY. There is no reason why it should not be bought for mines, so far as I can see.

Mr. SMITH. And therefore there is no reason why the searchlight money should be divided into two items of the bill? They are all searchlights for the protection of the harbors?

General MURRAY. None that I know of. We would have to increase that. If the National Board of Defense made it, we could find there their estimate of the cost of searchlights for both guns and mine defense.

Mr. SMITH. But this note does not indicate that any portion of the estimate of $350,000 was intended for searchlights?

General MURRAY. For mine defense.

Mr. SMITH. Or for any other purpose of searchlights?

General MURRAY. That is not intended for searchlights.

Mr. SMITH. But you are asking to put the words "searchlight outfits" in there. It is so printed here.

General MURRAY. That is correct.

Mr. KEIFER. It says, "For the purchase of searchlight outfits."

General MURRAY. This sheet that I submit to you here [submitting same], if you will examine it you will see that there has been no searchlight yet bought for any of the places.

Mr. SMITH. Having it all together in the bill, the language, "For the purchase and installation of searchlights for the defenses of our most important harbors," in sending the estimates in the War Department asked also to insert in the section with reference to mining casemates, etc., the words "and for the purchase of searchlight outfits for submarine mines." Now, what is the necessity for having two searchlight items for harbor defense?

General MURRAY. There is no special necessity for it, except that the gun and mine lights have heretofore been considered separate items.

Mr. SMITH. Is it not a fact that every searchlight that you have got for your mines and that has been handed over to you by the Engineer Corps was bought out of this item here? I am satisfied there has not been a searchlight in your service bought under a separate appropriation. Every searchlight you ever had was bought under this item.

General MURRAY. That was before the mine work was turned over to the artillery?

Mr. SMITH. Yes.

Mr. KEIFER. Before getting away from that I want to see if there was anything meant by the peculiar language used. The new language, if you will notice the italicized language, says, "and the purchase of searchlight outfits for submarine mines." Is there any significance in the words "searchlight outfits" as used there?

General MURRAY. Yes, sir.

Mr. KEIFER. What is it?

General MURRAY. It includes not only the searchlights, but the power plants for those searchlights, which I said the national Coast-Defense Board had added to the estimates we had before.

Mr. KEIFER. Then this is not confined to searchlights alone, but includes searchlight outfits?

General MURRAY. The searchlights and the power plants necessary to give the power to those lights.

Mr. KEIFER. I wanted to know the reason why the words "searchlight outfits" were used. If it is something more than the other, we would like to know it.

Mr. SMITH. The other language gives everything they speak of: "For the construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories." That includes your power houses without this language.

Mr. KEIFER. I don't know. The language on page 4 is: "For the purchase and installation of searchlights for the defenses of our most important harbors," while this new language on page 6 is, "and the purchase of searchlight outfits for submarine mines." I was trying to find out whether a different meaning lay within the two phrases.

General MURRAY. I had nothing to do with the language of the two items. I am only trying to interpret it as best I can. I would say that it was intended by the engineers to cover in the item on page 4 the searchlights only for guns, and the item on page 6 they intended to cover the searchlights and power plants connected with them.

Mr. SMITH. Are the small searchlights you have in connection with the coast defense of good quality, aside from their size?

General MURRAY. They were good for the time they were made. Unquestionably there have been improvements in everything connected with the searchlights, so that if you made lights to-day of that same diameter you would have better lights than you would have got at the time these were made.

Mr. SMITH. You have no need of so powerful a light for the torpedo defense as you have for the purposes of the seacoast batteries, have you?

General MURRAY. No, sir; but a 36-inch light is about the minimum light that we should have for our mines. The distance of the mine fields from the guns—the extreme distance—is about 3,500 yards, so that we want a light not only to cover the 3,500 yards, but the distance beyond, so that we could pick up a boat before it would get down to it.

Mr. SMITH. Pardon me; did you mean to say from the guns or from the mining casemates?

General MURRAY. I meant guns. I should have said that the exterior limit of mines is generally placed at the interior limit of fire of mortars, or about 3,000 yards away. In other words, you want to hold the enemy outside the dead angle of mortar fire.

Mr. SMITH. But in discovering these boats you would discover them from the mining casemates, would you not?

General MURRAY. No, sir; from the observing stations. They would be located anywhere, at the best places from which we can see, like the fire-control stations.

Mr. SMITH. Is it not the purpose if possible to locate these observing places for the mine casemates as near as possible to the mine casemates for the purpose of communication between the two?

General MURRAY. It is not necessary, but of course it would be advantageous to have the two near together, so that they could communicate. But it is not necessary. They may be at any distance, with telephonic communication.

Major WEAVER. In the use of mines and in the defense of a mine field there are two distinct objects. One is to obstruct the path of the enemy's ship and to destroy it as it passes over the mines, and the other is to prevent interference with the mines by small boats of the enemy attempting to open up a way for the larger ships through the mine field. For the defense of a mine field from interference by small boats we have rapid-fire guns placed in advantageous positions, and for that purpose our searchlights should be of sufficient power to pick up these small boats. These two distinct features should be kept in mind.

General MURRAY. Another thing I would like to explain to the committee: Not only do we expect the battle ship to strike the mines and fire them, as we call it, by contact, but in case the battle ship should pass through the line of mines without striking the mines we wish to fire the mine nearest to her in order to destroy her before she gets through the mine field. In order to do that, which we call our "judgment firing," as distinguished from contact firing, which I just named, we take up a ship before it reaches the mine field and plot its course. We have on our map the positions of the mines, and in order to get that plotted position we must take her beyond our mine field and as she passes beyond, and locate her by judgment.

Mr. SMITH. You locate her, then, by the system of fire control?

General MURRAY. Yes. That necessitates the fire control for our mines, or else we have to make our mines so thick together that there would be no possibility of an enemy getting through, and then we are limited again by the distance that we must keep our mines apart in order to keep them from exploding one another.

Mr. KEIFER. For your own safety?

General MURRAY. No; exploded by sympathetic explosion.

Major WEAVER. One mine exploding would explode adjacent mines if the latter were too close.

Mr. KEIFER. I understand that.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, ETC., FOR SEA-COAST-ARTILLERY PRACTICE.

Mr. SMITH. What further do you want before we get over to this practice ammunition, General, on page 12, at the top? On this item I do not think we need to ask you many questions, because I see from the estimates you ask just what we gave you last year.

General MURRAY. With regard to that I ought to tell you that, as I have called attention before to the necessity for target practice, it is upon that alone that we can develop the full value of our guns. We must have it. If this appropriation was made, the allotment for target practice would probably be about $290,000. The rest of it, $60,000, would go for the purchase of subcaliber tubes, dummy targets, projectiles, and other such things. If you allot us the $290,000 from this estimate, this will permit us to hold two service practices, with an allowance of three trials and four record shots for each practice. That is, if anything, a little less than we should have. It certainly is the minimum in order to get good work from our artillery. I would prefer to have an increase, if possible.

Mr. SMITH. There is one matter that we interrogated General Crozier about yesterday, and in view of your statement I would like to have it cleared up a little. Now, you assign a company to a battery of two or three or four or five guns. You spoke something about their manning as many guns as the force or size of the company would permit a little while ago. Now, in that way is the amount of practice shooting in any way reduced under what it would be if the company were full? I simply wanted to clear up the little apparent obscurity.

Major WEAVER. You mean whether the company was up to its authorized strength or the battery was completely manned?

General MURRAY. It would not affect it.

Mr. SMITH. That was the opinion of General Crozier.

Captain HAGOOD. The shortage of men in a company does not in any way affect the allowance of target practice.

Mr. SMITH. I wanted to clear that up because the statement, made without explanation, that they manned as many guns as the force of the company would permit, might leave that a little cloudy.

General MURRAY. Three trials and four record shots per company.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, ETC., FOR MOUNTAIN, FIELD, AND SIEGE ARTILLERY PRACTICE.

Mr. SMITH. I think your next item is on the top of page 13, where you ask an increase of $23,000.

General MURRAY. An increase over what was appropriated last year?

Mr. SMITH. And the year before; yes.

General MURRAY. The estimate submitted by the Secretary of War for last year was $100,000, and $77,000 was appropriated.

Mr. SMITH. And $77,000 the previous year.

General MURRAY. Yes. Last year we had $69,146 allotted to us for field artillery target practice. The rest of the $77,000, as I stated before, went for the purchase of subcaliber tubes, dummy targets, ammunition, etc. Of the $100,000 estimated for the coming year it is probable that we will get for field artillery target practice about $83,000.

Mr. SMITH. What do you say, General, as to whether the practice during the last year, even with the entirely new gun, showed as great accuracy in the artillery operations of the movable guns as that of any other country?

General MURRAY. My information is to the effect that the firing at Fort Riley is fully up to, if not superior to, the accuracy of firing by field artillery of any other country.

Mr. SMITH. Without having the percentage, do you know how it compares with the percentage of any other countries with their artillery.

General MURRAY. I can only say, in a general way, that the firing has been excellent at Fort Riley and considered at least equal to that made by any other country. We are now trying to supply all our batteries with an equipment for indirect firing by the fire-control system; that mode of firing was used almost entirely in the Russo-Japanese war, and you know with what destructive results. For such firing it is especially necessary that we should have ammunition to practice with, so that, if anything, we shall need in order to develop our indirect fire with the mobile artillery more ammunition than we needed when we simply fired directly.

Mr. SMITH. Have you the system of fire control under way yet?

General MURRAY. Yes; we have been working with one for some time at Fort Riley.

Mr. SMITH. You have been having appropriations two or three years for fire control in the mobile operations, have you not?

General MURRAY. It is being developed, and they have about finally decided on the system.

Major WEAVER. They have been using the indirect method at Fort Riley for two years, at least. I personally witnessed some indirect shrapnel practice with the new material two years ago which was excellent.

Mr. KEIFER. With field guns?

General MURRAY. Yes, sir.

Mr. KEIFER. We sometimes get into confusion between the coast guns and the field guns.

Major WEAVER. It is a very important distinction.

Captain HAGOOD. And it is very important to keep them separated.

SUBMARINE MINES.

Mr. SMITH. Now, the next item we want to hear you on, General, is on page 17. The other item was for the work of the engineers. This is for the mines themselves.

General MURRAY. That was for the purchase of mines. This on page 17 is the estimate for the purchase of mines which were purchased by the Ordnance Department. If you will examine the same blueprint sheet that I gave you before, you will see that the Ordnance Department covers one of the departments that supply that. The

total amount required to be purchased by the Ordnance Department for the equipment of the United States is $1,825,835. Of this amount $400,000 is asked for this year, which would still leave $1,425,835 yet to be supplied by the Ordnance Department.

Now, as to the material, you will notice that is under the head of the Ordnance Department. You will notice there on the blueprint [indicating] one headed "Position finders," one "Mine telescope," one "Plotting board," and the other headed "Torpedo depot," Estimate B. This Estimate B, or Sheet B, gives in detail all that is included under this heading, and the Sheet B shows—the blank spaces show—what has been supplied.

Mr. SMITH. In that connection, does not this show that the engineer work is far in advance of the ordnance work now?

General MURRAY. The figures as to the amounts yet to be appropriated indicate about $1,000,000 of work yet to be done by the engineers, $1,425,000, that is, provided you give us the appropriation this year.

Mr. SMITH. What was the original cost of the engineer work as compared to the ordnance work?

General MURRAY. I should say that the ordnance work was originally possibly a trifle greater than the engineers.

Mr. SMITH. I notice that you ask for $50,000 more for ordnance than for the engineers this year.

General MURRAY. Yes, sir. You can see that it is necessary for us to get this material. It takes time to get it. I want to bring it up to $1,800,000 at the rate of $400,000, and that would still take us over four years to secure that amount and to complete our work here in the United States.

Mr. SMITH. What is the fact as to whether all the most important harbors of the United States are practically completed now, at least as to the engineers?

General MURRAY. At Narragansett Bay there is some little work to be done by the engineers. You might call that an important harbor. At the eastern entrance to Long Island Sound there is considerably more work to be done by the engineers. That is a very important place, of course, in our defense.

Mr. SMITH. You say "considerably more." How much would it cost to complete that work?

General MURRAY. At the eastern entrance to Long Island Sound?

Mr. SMITH. Yes, sir.

General MURRAY. By the engineers?

Mr. SMITH. Yes, sir.

General MURRAY. Seventy-five thousand dollars, excluding the cost of the searchlights.

Mr. SMITH. That is satifactory. Now, what great harbors of the United States require any considerable sum of money for the engineers?

General MURRAY. San Francisco.

Mr. SMITH. And you told us that you allotted money to complete that work?

General MURRAY. But we took it away on account of conditions there.

Mr. SMITH. I did not understand you, perhaps, then. Did you reallot it?

General MURRAY. We reallotted it to eastern harbors because they could not expend it there and we could expend it here to the advantage of the Government.

Mr. SMITH. Would you say there was any important harbor of the first class outside of San Francisco that was not now substantially defended by this system?

General MURRAY. The mine system?

Mr. SMITH. Yes, sir.

General MURRAY. Do you mean which the Engineers have not completed, or that we have not completed the mine system?

Mr. SMITH. I would like to know, first, the Engineers, and second, as a whole. I want to know what important harbors there are in the United States that require any considerable appropriation for the completion of the submarine defense?

General MURRAY. The important harbors are practically completed.

Mr. BRUNDIDGE. I notice that for 1907 you estimated for $600,000, and you were given $300,000 by Congress.

General MURRAY. Yes, sir.

Mr. SMITH. For 1908 you estimate for $400,000?

General MURRAY. Yes, sir.

Mr. BRUNDIDGE. Why is it that your estimates for 1907 were so much more than for 1908?

General MURRAY. The estimates of $600,000 for 1907 were made by the Ordnance Department and that was approved by the Secretary. We got $300,000. I think the Secretary himself cut that estimate down to $300,000, and the appropriation was made in accordance with the cut made by him. For this year I asked them to increase the estimate $100,000, calling attention to the fact that $1,800,000 is wanted, and it was a question what would be a reasonable amount to ask from this committee, and after talking it over in committee it was first inserted at $300,000, and the Secretary of War insisted first that he would not make an increase. After I showed him that we needed $1,800,000 he said, "I will approve the extra $100,000, and you can do the best you can and know how with the committee."

Mr. BRUNDIDGE. This reduction in the estimate is not because of the work being any nearer completed than it was in 1907, when you made the other estimate?

General MURRAY. Only to the extent of the $300,000 that you have appropriated. It is simply a question of what is a reasonable amount to ask yearly.

I have before me the comments which a board of review made on the mine work that was done in the maneuvers of 1905 at Fort Monroe. The board of review consisted of two naval officers and three General Staff officers. They made some comments with regard to the mine work and the necessity of completing our system in the United States, and if the committee will allow me I will read it, so as to show what this committee thought of their work:

The efficacy of submarine defense was amply demonstrated. Land defenses of themselves alone can not be relied upon to guard at all times against a run-by by an active and enterprising naval commander. Darkness, fog, smoke, rain, and other conditions may operate so to reduce the effectiveness of gunfire ashore that the passage of a hostile fleet can not be wholly prevented. In such circumstances the main reliance must be placed on the mines, whose action is not dependent on such conditions and whose operation can at all times be depended upon. Because of its immense coast line and because of its military

and commercial policies there is no nation in the world to which the question of mine defense applies more consistently and advantageously than our own. Neither time nor money should be spared to put it in first-class working order. It was noted that in these exercises, as in the previous Army and Navy maneuvers, the School of Submarine Defense at Fort Totten was relied upon to plant and operate the mines, and officers and matériel were sent from there for the purpose. This can not be said to simulate service conditions. The inference argues a condition of unpreparedness in the artillery districts which should be remedied as soon as possible. Every artillery district in the United States should be prepared to lay mines simultaneously and operate same effectually, by its own resources, within forty-eight hours after declaration of hostilities. The expenditure entailed to accomplish same would constitute a form of effectual insurance, the premium on which, in comparison with other forms of insurance, would be ridiculously small.

I read that simply to show how our mine system is regarded by experts, two of whom were naval officers and three general staff officers.

TORPEDO PLANTER.

Mr. SMITH. Last year the army bill contained an item for the construction of a torpedo planter upon the Pacific coast which was stricken from the army bill on a point of order on the ground that it belonged to this committee. Notwithstanding that fact, I am advised that in the estimates sent to the Military Committee again this year was included this torpedo planter. It has been intimated to me that, in view of the ruling of the Chair, there would probably be a rereference of that item to this committee before the final completion of this bill. In view of that fact, I will ask you what necessity exists for such a boat, a description in a very general way of its character and functions, and the amount that will be necessary for its construction?

General MURRAY. First, as to the necessity for the boat. The torpedo planter is absolutely essential for submarine mine instruction. The only way you can learn how to plant mines and to operate them is, of course, to plant them and then to operate them from the place on shore. We have no boat of any kind on the Pacific coast and have heretofore been forced to hire a boat of the lighter type that is not suited to mine service. It is not properly fitted for the work and the work can not be done as it should be. A mine system to be effective must be planted before the enemy gets to the harbor, in a short time. In order to do the work properly the appliances for doing it must be on hand and a planter is an absolute essential to plant the mines expeditiously and to have them in thorough serviceable condition after planting. San Francisco harbor alone is one of the most difficult to mine. In the channel proper the water is so deep and the tides are so swift that it is impossible to plant mines. Under the old project of the engineers it was contemplated that the mines should be planted on the inner harbor. My own views are that they should be planted out at the entrance to stop vessels under the fire of the guns. So I began experiments at once, as soon as the matter was turned over to me, to see whether or not mines could be planted on the outer bar of the harbor.

I am satisfied from the experiments that have been made with the tugs and other boats that we have there that this can be done, but to do it a special boat made for that purpose is needed. To do it expeditiously the best type of boat that can be had should be provided.

Not only would this planter be needed for work at San Francisco, but we have no boat for instruction purposes at San Diego or at the mouth of the Columbia or in Puget Sound. This boat, if we get it, will be used as the boats are now used on the Atlantic coast—to go from post to post, devoting a month or six weeks, according to the amount of work to be done in each place. So much for the boat.

As to its class, since the boat has to go from harbor to harbor, it should, of course, be a seagoing boat. The boats we have on the Atlantic coast are seagoing lighters of the same type as the naval light-house tenders. They are equipped with a derrick for hoisting the mines, for getting out the cable, and with all the apparatus necessary for planting mines. They are also used for instruction purposes, and have quarters not only for the ordinary crew of the boat, but also for a number of trained artillerymen skilled in mine-planting work, who go from harbor to harbor, acting as instructors of the men at the several ports visited. After instructing these the latter are turned over to each place to do the work of mine planting. The boat is a seagoing boat with accommodations for a crew and for about 20 soldiers and the two officers that are put on the boat.

The general type of the light-house tender is sufficient to explain the type. The cost of boats of the light-house tender type on the Atlantic coast (150-foot boats) is about $130,000 each, with all appliances. On the Pacific coast, owing to the nature of the coast, the boat should be unquestionably slightly larger, and I should say it would take a 175-foot boat. The cost of such a boat, taking as a guide the light-house tenders of the same type that we have on this coast, would be about $175,000, and that is the estimate made for that boat.

TORPEDO PLANTERS ON ATLANTIC COAST, NUMBER OF.

Mr. SMITH. How many torpedo planters have you on the Atlantic coast?

General MURRAY. Four.

Mr. SMITH. In the time of war one on the Pacific coast would be of no use except for one place?

General MURRAY. It would depend how soon the enemy got there. In San Francisco harbor it would take at least one boat to be there all the time. We will have to do the best we can. This boat being used for instruction purposes has some things on it that we would not want if we were only using it for submarine-mine planting there, but we would have to have certain appliances on it.

Mr. SMITH. What I was trying to get at was, in view of the fact that in time of war the boat would have to be at one port whether it would be desirable to establish one boat of the seagoing type on the Pacific coast or to establish two boats similar to those on the Atlantic coast, one at Puget Sound and one at San Francisco?

General MURRAY. It is questionable to my mind whether the 150-foot boat on the Atlantic coast would be large enough to stand the seas even if we should have two boats; but that is a question that somebody who is more of a mariner than myself would have to answer. There is no question as to the need of the boat.

INSULAR POSSESSIONS—FIRE CONTROL.

Mr. SMITH. I believe that covers continental United States. I find in the bill, on page 18, a proposed appropriation for fire control in

the insular possessions. This estimate is made by the engineers. You are aware that there are no guns mounted in the insular possessions except the Spanish guns?

General MURRAY. Yes, sir.

Mr. SMITH. So that the need of this appropriation is dependent in a measure upon how soon the committee ascertains from other sources there will be any guns to use the fire control system with?

General MURRAY. That is correct; yes, sir.

Mr. KEIFER. What department is engaged in mounting the guns there?

General MURRAY. The engineers first build the emplacements and then the Ordnance Department supply the guns. At the present time I have not the exact data, but I know that they are building one emplacement for mortars at one of the harbors, Manila.

Captain HAGOOD. They have a mortar battery out in Manila and a 12-inch gun battery, and the Ordnance Department has under construction guns and carriages for these batteries.

Mr. SMITH. But none mounted yet?

Captain HAGOOD. No, sir.

Mr. KEIFER. How could you get along with the guns without the fire control?

General MURRAY. It is not possible to get the use and full value of the guns without the fire control.

Mr. KEIFER. We did not use to have any fire control.

General MURRAY. No; you had an entirely different kind of gun and different range.

Mr. BRUNDIDGE. There is no immediate necessity for this appropriation in view of the fact that you can not get these guns mounted and have them under fire control before this committee would have an opportunity to make another appropriation. There is no such likelihood of that?

Mr. KEIFER. This appropriation is for 1908.

General MURRAY. I think it would be well if the committee would agree to begin all of the work. It takes time to purchase all of the fire-control apparatus, its searchlights, and all the other accessories that we use with the guns and the mortars, and it is a question of relative time as to whether you would want to build them and then wait a year or two longer before you can get them. I should say that the work should all go on together. We can easily store fire-control material until the guns could be mounted. The stations that are wanted in connection with the fire control could as well be built, and should properly be built at the same time the gun emplacements are being built, because they are built by the same department, and if not done at the same time it necessitates keeping the working force there a much longer period. For that reason I should say that they should, as far as possible, go along together.

Mr. SMITH. Where do you expect to get the men to man the fortifications in the Philippines?

General MURRAY. If the recommendations which have been made for the reorganization of the artillery and for its increase be favorably acted on by Congress, it is thought the personnel can be provided.

Mr. SMITH. I mean after they are authorized, how can you get them?

General MURRAY. I would say this: The present bill we have before Congress asks for an increase in our force to bring us up to approximately 50 per cent of what is wanted for manning everything that is now completed in the United States. In that 50 per cent I should say that there are three different grades of men—one we will call first-class experts, another second-class experts, and the other ordinary artillerymen. The first-class experts it will take us from two to three years to train; the second-class experts, from one to two years, and the other, probably we could make a good soldier out of him in a month or so. As to the relative proportion of these men, say we had 20,000 men, there would be about 2,000 experts of the first class, 6,000 experts of the second class, and 12,000 ordinary artillerymen. For the whole defense of the United States we need about 40,000 men. If I could get all of the experts required for those 40,000 men and hold them in my 50 per cent I am now asking for, I think then we would be in as good a condition for war as we could expect. In other words, having 50 per cent for one manning detail for all the guns you have given us, and including in that 50 per cent all the highly trained men that we need, we could then fill up the other 50 per cent with either recruits or, preferably, with what you might call artillery reserves made from our National Guard.

If we could parallel our regular companies in each harbor with home companies of coast artillery reserves, as you might call it, then we would have, say, the 100 per cent of the men that we need, and I think that would be about as much as we could expect. In this bill we ask for men enough to bring us up to about 50 per cent. We do not ask, however, for the money to pay for all of the experts that are wanted, the 8,000 experts of the first and second class, but to pay for only about 1,700 of the experts of the first class, and extra pay for those men, this with a view of holding that higher class, hoping that thereby we will be able to hold the second class, and still further hoping that the second class will hold men in the third class and more recruits will be attracted by the increased opportunities for promotion to desirable positions.

We are asking for as little as we can, with a view to seeing what can be done.

Mr. SMITH. If you do not get some provision for an increase of pay, you can only man the insular fortifications by putting some more in the continental United States out of commission?

General MURRAY. If you will give us the increase we could undoubtedly get practically the same percentage in the new companies that we have in the present organizations. The probability is that with increase alone we would get somewhere in the neighborhood of the same percentage that we have at the present time. Give us the new organizations, and I think we will get up to the same percentage we have now.

Mr. SMITH. Unless the army bill increases the number of your organizations you can not man the insular fortifications at all without putting some more in the continental United States out of commission?

General MURRAY. That is correct.

Mr. KEIFER. Is it more difficult to get men for service in the Phil-

ippines than it is for the seacoast artillery on the Atlantic and Pacific?

General MURRAY. That is problematical; but I would say that we could probably get men for one enlistment out there.

Mr. KEIFER. There are a great many men who want to enlist and go to the Philippines?

Colonel WEAVER. They get increased pay and are credited with double time toward retirement.

General MURRAY. I believe that they would want to go out there for one enlistment.

Mr. KEIFER. Out in the central West the men would sooner enlist and go there than go to New York.

General MURRAY. There is one point that I would like to call attention to. You were asking me with regard to the fire control for the Philippines. I would say that as we have not any guns mounted in the Philippines and we have a goodly number in the United States for which we have no fire control, if there is to be any cut in the fire-control estimate I would, of course, recommend that you make the cut in the Philippines and give us the amount estimated for for home.

INSULAR POSSESSIONS—PURCHASE OF SUBMARINE MINES AND NECESSARY APPLIANCES.

Mr. SMITH. I would like to call your attention especially to the item on page 22, " For the purchase of submarine mines and necessary appliances to operate them for closing the channels leading to the principal seaports of the insular possessions, $205,440." How much of this amount is for Manila?

General MURRAY. For Manila, $724,000. That is the total amount required for everything at Manila.

Mr. SMITH. That is just what I thought. This says $205,440 is to be one-third of the whole amount for Manila, Subig Bay, and Guantanamo, and yet it is not a third of what you say is needed for Manila.

General MURRAY. This is for the ordnance department. The one-third for Manila would be $130,000. The one-third for the three places as given would be $202,161. That is for the three places named.

Mr. SMITH. Have you figured the amounts for Subig Bay and Guantanamo separately?

General MURRAY. The entire amount for Manila is $309,130; for Subig Bay, $142,177, and for Guantanamo, $72,413.

Mr. SMITH. And one-third of each of those is supposed to be in this estimate?

General MURRAY. Yes, sir.

Mr. SMITH. That is the last item in which you are interested?

General MURRAY. Yes, sir.

Mr. KEIFER. Do you think of anything further that you want to say in regard to any part of the bill?

General MURRAY. I know of nothing now. Possibly Colonel Weaver, my assistant, may have something in his mind.

Colonel WEAVER. No; I do not think I have.

Mr. SMITH. We are obliged to you for your attendance.

FRIDAY, *December 7, 1906.*

ENGINEER DEPARTMENT.

STATEMENTS OF GEN. ALEXANDER MACKENZIE, CHIEF OF ENGINEERS, AND COL. FREDERIC V. ABBOT, ASSISTNAT TO CHIEF OF ENGINEERS.

CONSTRUCTION OF GUN AND MORTAR BATTERIES.

Mr. SMITH. I notice that in your branch of the service you got $4,247,400 for the construction of gun and mortar batteries for the continental United States.

Colonel ABBOT. Yes, sir.

Mr. SMITH. Does that estimate include what is thought to be the necessary expenditure within the year, approximately, or would it approximately complete the Endicott scheme?

Colonel ABBOT. It was not based on the Endicott scheme, but on the Taft scheme, and it was proposed to take up the work at Boston, the eastern entrance to Long Island Sound, Chesapeake Bay, and Puget Sound, numbering, in all, four places which were recommended by the Taft board for immediate completion, and to complete those places as far as we have sites at the present time. Some other sites will have to be bought. That sum is what we estimate would be required to put in emplacements for all the guns we can mount on the sites that we now own in those localities. The work could be done in approximately two years' time. We never start a battery without having funds to finish it. It takes two years to finish one. The expenditure would be complete within two years. We would not feel justified in beginning work on a $4,000,000 basis unless we had that amount of money already appropriated.

Mr. SMITH. Who finally and definitely determines the location of gun and mortar fortifications?

Colonel ABBOT. They were formerly determined by the Board of Engineers in New York. They personally examined the different harbors and laid out the general plans, which were then approved by the Secretary of War on the recommendation of the Chief of Engineers. When money was actually appropriated, district engineer officers studied the ground in detail, made accurate surveys, and found whether it was necessary to move any of the proposed locations slightly. For instance, there might be a slight obstruction in front, and if by moving the battery sideways a better location could be found, that was done. That was the original system. At the present time it is done by the Secretary of War on the recommendation of the Chief of Engineers or of any special board organized for the purpose.

Mr. SMITH. Please state your relation to the office of Chief of Engineers.

Colonel ABBOT. I am lieutenant-colonel, Corps of Engineers, and have in charge the fortification and the personnel desk in the office of the Chief of Engineers, to whom I am assistant.

Mr. BRUNDIDGE. Why was there no recommendation made under this head?

Colonel ABBOT. Because the Secretary of War struck it out.

Mr. SMITH. Now, does this item include a portion of the money necessary for the proposed new fortifications at Cape Henry?

Colonel ABBOT. Yes; they are covered explicitly in the estimates the Chief of Engineers submitted to the Secretary of War in his annual report. There were two 14-inch, two 10-inch, and four 6-inch guns, all on disappearing carriages, and four 3-inch rapid-fire guns on pedestal mounts. They are partly on Cape Henry and partly on an artificial island. The estimate for the artificial island the Secretary of War left in his estimates.

Mr. SMITH. Under what head?

Colonel ABBOT. Sites for fortifications.

Mr. SMITH. Do you think that the construction of an artificial island should be included in the purchase of sites?

Colonel ABBOT. Yes; it is procurement or reclamation of land for fortifications for seacoast defense, as the wording of the law permits.

Mr. GRAFF. That would come under the head of "Reclamation of land."

Colonel ABBOT. Yes. A good deal of ground has to be made there; it is, in fact, creating an artificial island similar to what the Japanese put in at Tokyo. Vessels can pass without coming within 5 miles of any guns proposed to be mounted on Cape Henry proper.

Mr. GRAFF. There is some elevation there now?

Colonel ABBOT. The proposed site for the island is a shoal which has not changed in one hundred and twenty years.

CAPE HENRY AND CAPE CHARLES DEFENSES.

Mr. SMITH. There seems to be a good deal of talk about the defenses at Cape Henry as being part of the defenses of Chesapeake Bay. The outer defenses are referred to, substantially, as the same defenses, are they not?

Colonel ABBOT. A fort on a natural island near Cape Charles, another on Cape Henry, and a heavy armament on this island constitute the only proposed defenses for the entrance to Chesapeake Bay. Neither fort alone would hold the entrance without the others.

Mr. SMITH. Is it not usual to refer to Cape Henry as an entire description of that locality?

Colonel ABBOT. No, sir; I should say not.

Mr. SMITH. The line of defense is to be on the line between Cape Henry and Cape Charles, passing through the proposed island?

Colonel ABBOT. Yes.

Mr. SMITH. Are all of these substantially new projects?

Colonel ABBOTT. Yes. No defense of the entrance of Chesapeake Bay was called for by the Endicott board scheme, as that board believed the entrance too wide to be held by guns on shore and did not believe the cost of constructing an artificial island was justified at that time. They thought floating defenses were needed at the entrance.

Mr. SMITH. You spoke of something being needed at New York, and I think at Boston.

Colonel ABBOT. Not at New York, but at the eastern entrance of Long Island Sound. The Taft board plans call for emplacements for one 16-inch gun, for two 14-inch guns, and for four 12-inch rifles on sites we now own. This entrance is considered by the Taft board

as the second in relative importance in the work of defending the coasts of the United States. The entrance is extremely wide the current is strong, and ships can therefore enter on the flood tide with great speed. To provide a full defense there, more guns are absolutely necessary.

Mr. SMITH. What important points are open to attack if the enemy pass the fortifications at the eastern entrance of Long Island Sound? Are not the eastern entrances of New York Harbor thoroughly fortified?

Colonel ABBOT. There is New Haven, Stamford, Bridgeport, Norwalk, New London, Groton, Niantic, and a number of smaller manufacturing towns on the shore of Connecticut. Possession of Long Island gives a splendid chance for an enemy to land a force on Long Island and attack New York and Brooklyn from the rear.

Mr. SMITH. Are not the present fortifications at the entrance of Long Island Sound considered good?

Colonel ABBOT. Yes; there is a considerable amount of heavy armament in position, but recent announcements of the Ordnance Department with reference to the life of 12-inch guns of model 1901 have made a great deal of difference in the situation there. It is stated now that the guns will not stand the heavy charge of smokeless powder needed to give them their full efficiency for more than sixty rounds, which makes it necessary now to have larger guns for the extreme ranges at which the 12-inch guns of model 1901 were formerly considered effective. They must now be replaced by 14-inch guns.

Mr. SMITH. Won't the navy guns wear out equally as fast? Practically none of them have more than 12-inch guns now, have they?

Colonel ABBOT. Probably not, in the newer ships. Our Navy carries a number of 13-inch guns.

Mr. SMITH. Would not the naval guns wear out as fast as the army guns would if they were on board a ship?

Colonel ABBOT. If they were fired as rapidly and they used the same charge of powder; yes. The navy projectile is lighter and they get a greater initial velocity with the same charge of powder, but the shot does not shoot as far. The heavy army projectile has with an equal charge less velocity, but due to its greater weight it has an increased capacity of retaining what velocity it has.

Mr. SMITH. Is there any other important place that is not thoroughly well fortified to the extent that is now true at the entrance of Chesapeake Bay?

Colonel ABBOT. I do not think that any naval vessel would try to get in close to any of our fortifications mounting modern high-power guns, because of the disproportion between the benefits of passing any fort and the injury should one of the costly ironclads happen to be hit. The disproportion is so great that they would probably stay out.

Mr. SMITH. Without meaning in any way to disparage the action of the board, no fortifications at the entrance of Chesapeake Bay were included, except in the most general terms, in the Endicott scheme at all, were they?

Colonel ABBOT. All but floating defenses were omitted, on the ground that the entrance was practically too broad to be closed at a cost commensurate with the interests to be protected, but the Navy

has since taken the position that Chesapeake Bay is the most important strategic defense needed at the present time. The Army felt, I think, that if that was the idea of the Navy they were bound to give the Navy the support it needed that its ships might be free for offensive attacks on the enemies' fleets.

MODERNIZING OLDER IMPLACEMENTS.

Mr. SMITH. The next item is "Modernizing older implacements." A year ago it was quite fully explained to the committee that owing to the increased power of the modern explosives many of these implacements put in early under the Endicott scheme were subject to injury, especially the cement portions were in danger of being cracked and broken.

Colonel ABBOT. That idea was presented more particularly in connection with the item for the preservation and repair of fortifications. The need of modernizing was brought about rather by the increased speed with which the artillery are firing guns. They find that they need larger space on the platform to accommodate without confusion the number of men required to ram the load into the gun as rapidly as they do it now. They are firing a 12-inch gun more frequently than once a minute. All ammunition service was based on the former idea of one round in five minutes, and consequently the original means of handling ammunition are not capable of meeting the speed at which the heavy projectiles and bulky powder charges of the guns can now be fired. We have been going over them and putting in electrical shot hoists and widening the loading platforms, so that the gun crews can manipulate the guns better. If we can fire twice as often as we formerly did, and do it with the same accuracy, one gun becomes equivalent to two guns. Facilitating the service of the guns is thus the cheapest thing to do.

Mr. SMITH. You would rather build new emplacements than new guns. That would be entirely true if it were not for the fact that two guns would not wear out as fast. The modern gun will not last more than one hour.

Colonel ABBOT. The older models will stand three or four hundred rounds, and we have emplaced comparatively few of the later models. The batteries are mostly armed with the earlier models.

Mr. SMITH. But they can not be fired with such large charges of powder as is required by the modern guns.

Colonel ABBOT. The older models should by no means be considered as obsolete armament. At Port Arthur the "electric" battery contained only five 10-inch guns, and after once getting within 13,000 yards of that battery and feeling its power Admiral Togo's orders were never to get within 13,000 yards of it again with any of his ships. They did not consider the 10-inch gun as ineffective even at 13,000 yards. We have never proposed to fight them at over 11,000 yards. Those earlier guns are still modern, although they are not as powerful as the more powerful ones which have since been invented.

Mr. SMITH. Does this item include the construction and increase of magazine capacity?

Colonel ABBOT. In some cases, where the old magazines under immense masses of concrete were not big enough to take in as many

rounds as are now wanted, we have built additional rooms under the new extensions to the loading platforms.

Mr. SMITH. What percentage of this work has been accomplished?

Colonel ABBOT. Progress is about proportionate to the part of the estimated cost expended. The estimates originally made have been closely followed in construction.

Mr. SMITH. You have received $600,000 for modernizing, including the last bill?

Colonel ABBOT. Three hundred and forty-two thousand five hundred dollars is the balance of the original estimate yet to be appropriated.

Mr. SMITH. It will complete it if we give it to you this year?

Colonel ABBOT. Yes, sir; I believe it will.

Mr. SMITH. It means, does it not, the completion of this work when two-thirds of the fortifications are now "out of commission?"

Colonel ABBOT. In an artillery sense, yes. It is hard to tell by appearances when a battery is "in commission" or "out of commission."

Mr. SMITH. You know whether the artillery is there?

Colonel ABBOT. Yes; but we can not tell without asking whether or not the battery is "in commission" or "out of commission."

Mr. GRAFF. Are they not covered by some sort of preservative?

Colonel ABBOT. They grease them up even when "in commission." When "out of commission" the batteries and machinery are kept in serviceable condition.

Mr. SMITH. But when they put batteries "out of commission," they do not as a rule put all the batteries in a harbor "out of commission" at one time, but keep some in each harbor in commission, and also some in each fort within the harbor?

Colonel ABBOT. A larger proportion is "out of commission" in some cases than in others. For instance, Fort Smallwood, at Baltimore, has an armament of only 6-inch and 3-inch guns, and is practically in the charge of caretakers only.

Mr. SMITH. Generally speaking, some batteries in every harbor are in commisson?

Colonel ABBOT. I should say that is true, although I have not here any exact means of knowing what are "in commission" and what are "out of commission." They do not show it by looking at them.

FIRE CONTROL.

Mr. SMITH. Now, we come to the item of "fire control," which has been much discussed here. I notice that the Chief of Ordnance gives the available balance and the Treasury balance of all funds that had been set apart for their share of this work from the gross appropriation made in recent years and also in prior years. Can you furnish us the same as to the Engineers' Department?

Colonel ABBOT. Yes, sir; we can.

Mr. SMITH. We want the unalloted balance and the Treasury balance.

Colonel ABBOT. I have a statement here showing for the 30th of November our unexpended balance (the sum of amounts "on hand" and "in the Treasury") and the amount covered by outstanding liabilities. That statement shows what is left of all the cash that was ever

turned over to us, either by appropriation by Congress, as formerly, or by allotment by the Secretary of War, as is the case under the last act. This statement shows the balance that is available for actual expenditure at the present time.

Mr. SMITH. We have been classifying all of these balances as Treasury balances and available or unallotted balances. Is this the balance in the Treasury which you are about to give us?

Colonel ABBOT. Yes, sir. We have in the Treasury funds not placed to the credit of the disbursing officers $533,628.28. The disbursing officers have to their credit $42,521.81.

Mr. SMITH. How much is the balance not allotted?

Colonel ABBOT. The balance that is at present unallotted is $214,228.37. While formal allotment has not been made, that whole sum has been pledged—$20,000 to Portland, and the balance to Puget Sound.

Mr. SMITH. You have done nothing at San Francisco?

Colonel ABBOT. On account of the earthquake we were asked by the Chief of Artillery to begin at Puget Sound. The artillery plans at Puget Sound had not been prepared at the time the act of June 25, 1906, became law. We did not get the information as to what final plans and estimates were selected by the Chief of Artillery until late in November, and those final plans have not yet been approved by the Secretary of War, but have been recommended to him for approval by the Chief of Engineers, the Chief Signal Officer, and the Chief of Artillery. As soon as his formal approval is received allotment of the $214,228.37 will be made to Portland and Puget Sound. Work can progress very fast on fire-control installations when plans are once adopted. Engineer work consists in the erection of a very large number of small houses. They are made small so as not to offer a good target. They are so numerous, however, and there are so many ducts and cables to draw that the cost is large in the aggregate.

Mr. SMITH. Aside from the matter of protecting your instruments in time of peace, are these little houses superior to tents that might be erected in emergencies?

Colonel ABBOT. The instruments are worth $1,400 or $1,500 apiece, and protection from stealing and injury is essential.

Mr. SMITH. Aside from the instruments, in what way are buildings of that kind preferable to tents in time of war?

Colonel ABBOT. We expected to have tents, originally.

Mr. SMITH. If the instruments are protected and stored, how long would it take simply to install them? A trifling time, would it not?

Colonel ABBOT. A very short time; but men have to be drilled in the use of these instruments. These instruments are unlike anything in use for civil purposes. The men have to learn how to use them. They can not be set up and taken down daily as you would set up and take down ordinary surveyors' instruments.

Mr. SMITH. Have you not fire control for training purposes completed at practically every port in the United States where guns are used?

Colonel ABBOT. Yes, sir. What is called "provisional" fire control is provided at each harbor now fortified. Certain stations have been built, all of which are to be utilized in the final standard fire-control installation at those harbors. They have been built to last.

Mr. SMITH. To what extent do you say that the actual service in time of war would be impaired if from now on we gave you a modest appropriation for the finishing of the permanent fire-control system.

Colonel ABBOT. The number of guns that could be fought under the present artillery tactics would be very much less than if the fire-control installation was completed, because the whole present system of rapid artillery service of the guns is dependent on the perfection of the fire control.

Mr. SMITH. They are drilled to use this fire control, anyway, in the "provisional" installations, are they not?

Colonel ABBOT. Yes; but there would not be enough men trained in the art to occupy all the new stations we could build in a short time upon the breaking out of war, because they would have few of the conveniences which we have in the later-type buildings we are now erecting. These have telephones and speaking tubes and booths, where the men receive communications by the telephone messages without confusion. The whole present system is based on the avoidance of confusion, where many messages must be sent and received constantly. The original idea was to have for each battery two instruments at the ends of a short base line from which the range only to a ship would be ascertained and communicated to the gunners, who would do the actual pointing with the sights on the guns; the elevation only would be governed by the range.

PROCUREMENT AND RECLAMATION OF LAND FOR FORTIFICATION.

Mr. SMITH. Have you any detail statement of what this $3,310,000 originally made was expected to cover?

Colonel ABBOT. $2,600,000 was for the creation of an artificial island. That is as accurate an estimate as could be made without borings, etc. Such preliminary estimates can not be as correct as if we had money to make surveys, etc. We have to make assumptions as to some things. That sum will be approximately what will be required to create an area of 50 acres, which the artillery say will be needed for the number of guns planned to go on that island. The breakwater and retaining walls have to be heavy and strong to avoid being washed away by the waves.

Mr. SMITH. Where is the title to the ground on which you propose to make this artificial island?

Colonel ABBOT. It is undoubtedly, I think, in the State of Virginia.

Mr. SMITH. You spoke something of its being shoal. What do you mean by that; that any portion of it was exposed at low tide?

Colonel ABBOT. It varies from 20 feet to 12 or 14 feet below water.

Mr. SMITH. Have you any arrangement by which you can get title from the State of Virginia?

Colonel ABBOT. The Secretary of War might by asking for it get an enabling act passed by the State legislature.

Mr. SMITH. When does the legislature of Virginia meet?

Colonel ABBOT. I do not know.

Mr. SMITH. Have you any reason to think that you could, if you wished, get the State of Virginia to act before the legislature meets?

Colonel ABBOT. I can not tell until I look up the question. The governor may be able to do it. I do not know.

Mr. SMITH. Don't you think that this whole proposition is, in a sense, premature until you find out something about the title?

Colonel ABBOT. Possibly, but it is vital to the defense of Chesapeake Bay.

Mr. SMITH. But you must have title first.

Colonel ABBOT. I do not know whether title would be in the State. The United States builds anywhere it pleases in South Carolina, so long as it founds its buildings on submerged land. I know that is the case with light-houses. If you put them in the water you have no trouble as to title.

Mr. SMITH. I suggest that General Mackenzie had better get some information, and if you can not do anything until the legislature grants the power Congress might not be willing to act.

Colonel ABBOT. Part of the money estimated for could be applied to the purchase of land at Cape Henry and near Cape Charles. What the price is would be hard to tell.

Mr. SMITH. Don't you think you ought to have some definite idea of the probable cost of land at Cape Henry and Cape Charles?

Colonel ABBOT. We have had figures on that.

Mr. SMITH. They have not been furnished to us.

Colonel ABBOT. Yes; we recommended $150,000 as enough in the first place, but by the next session of Congress prices had gone up and have been steadily rising since. There is justification for this, because it has become a summer resort, and an electrical railroad runs there from Norfolk.

Mr. SMITH. Not to both places.

Colonel ABBOT. The place at Cape Henry, where we want a site near Cape Charles, is Fishermans Island on which we shall need another site. This should be much cheaper.

Mr. SMITH. The establishment of batteries at Cape Henry and Cape Charles would be wholly useless without the island?

Colonel ABBOT. Largely so, in my opinion. Some naval officers think differently.

Mr. SMITH. In the present state of affairs is it possible for vessels to pass between Cape Henry and Cape Charles in comparative safety from guns from either place?

Colonel ABBOT. Comparative safety is a little doubtful term. They do not have to pass within 4½ to 5 miles of the nearest gun, but with the complete fire-control installation we have been installing recently the artillery could probably hit a vessel at those ranges if there were no haze, or mist, or darkness.

Mr. SMITH. Not with the guns you have now?

Colonel ABBOT. The 12-inch gun would produce serious damage at those ranges.

Mr. SMITH. The 12-inch gun would not produce any effect when fired with the proposed low charge of powder?

Colonel ABBOT. Yes, sir; it would be decidedly unpleasant for those on the ship under those conditions. While the projectile would not penetrate the thick armor, serious damages and loss of efficiency would result, as was found at Port Arthur when Toga's fleet got within extreme range of old 10-inch rifles in the shelter battery. Naval officers would hesitate to expose their ships voluntarily to any such danger. To hit fatally at 4½ to 5 miles would be difficult. The artillery would

hit the ships, but I do not think they would get in many fatal blows. Mist or fog would open the entrance to an enemy's fleet.

Mr. SMITH. Or the darkness of night?

Colonel ABBOT. Sufficiently powerful searchlights would remedy that. An enemy's fleet would probably be afraid to go too near the shoal water on the north side of the channel by night. It would not be safe, but they might be able to get by.

Mr. SMITH. When you revise the notes please furnish us any information you have or can conveniently obtain with reference to the probable cost of the land for fortifications at Cape Henry and Cape Charles, where the title to the land now rests on the shore where you expect to make this artificial island. If it is found to be in the State of Virginia, whether there is any means available to obtain title prior to the meeting of the legislature in order to convey it to the Government of the United States. In this estimate there was no amount allowed for the purchase of the site for the artificial island.

Col. ABBOT. The site at Cape Henry should not cost over $500,000, the sum contained in a bill presented to Congress at the last session, presumably at the suggestion of the owners, as it did not originate in the War Department. At Fishermans Island $30,000 is estimated as a fair price. The title to the shoal is in the State of Virginia. No means has been found for getting title prior to the meeting of the legislature. In the $2,600,000 estimate no item was included to cover the cost of getting title from the State of Virginia.

PROTECTION, PRESERVATION, AND REPAIR OF FORTIFICATIONS.

Mr. SMITH. The next item is protection, preservation, and repair of fortification for which there is no special appropriation available. This is the item that would cover the damage caused by the blowing away of the masonry by reason of the change in the character of the guns and explosives.

Colonel ABBOT. No cement work will withstand the shock and jar of neighboring explosions of smokeless powder.

Mr. SMITH. I think you said a year ago that another kind of cement had been found which would substantially withstand this force?

Colonel ABBOT. No, sir. If I had found one I would have tried it. I said the Rosendale cement, of which the older batteries were built, went to pieces much worse than the Portland-cement structures now built. The explosions tear everything to pieces.

Mr. SMITH. What is the effect of the proposed reduction of the charge of powder in the 12-inch guns? Will this not reduce the injury to the batteries?

Colonel ABBOT. I do not think it makes much difference. It is the suddenness of the discharge rather than the amount of powder used. The 10-inch guns injure their parapets nearly as much as the 12-inch. Under this item we have an immense mass of machinery which must be kept in order, such as electric-lighting plants, powder plants, shot hoists, electric retracting motors, etc. Each heavy battery has a complicated system of mechanical apparatus for moving heavy weights with great speed, which is unavoidably costly to maintain, especially when we consider that the whole must be handled by men who are paid at the rate at which the enlisted force of the artillery are paid.

We can not expect the machinery to have as competent attention as if it were handled by a high order of mechanics.

Mr. SMITH. The note taken from the estimates shows that it is only $20.81 per month per gun for each of the 1,200 guns now mounted. There are not 1,200 heavy guns now mounted.

Colonel ABBOT. There are 1,200, including the 6-inch and 3-inch guns.

Mr. SMITH. Suppose that in revising your notes you fill in the number of heavy guns. What do you call the 6-inch guns?

Colonel ABBOT. The 6-inch guns are on the border line. The 6-inch Armstrong guns can not be considered heavy guns. There are 756 heavy armament actually mounted (including all 6-inch but the 8 Armstrongs); there are 91 additional emplacements for heavy armament ready for armament, and armament is or will be shortly on hand for these. There are, then, 847 emplacements ready for high-power guns, and in them 756 such guns are now mounted.

Mr. SMITH. State at this point also, in the revision of your notes, how many 6-inch guns there are now mounted in the fortifications, and how many, including the mortars, are more than 6 inches now mounted.

Colonel ABBOT. There are 97 6-inch mounted and in addition 72 6-inch emplacements are ready for their armament; 668 heavy guns and mortars are mounted, excluding all 6-inch, and 23 additional emplacements are ready for their armament. There are, then, 691 emplacements ready for 8-inch, 10-inch, and 12-inch guns and 12-inch mortars, in which 668 such guns and mortars are now mounted.

Mr. BRUNDIDGE. Did you ask Colonel Abbot how much money he has on hand of the amount of the former appropriation?

Mr. SMITH. The note says it will be entirely out by March.

Colonel ABBOT. For preservation of fortifications we have at the present time unallotted $867. The money in the hands of disbursing officers and not absolutely expended is $214,000, but this has been pledged for work ordered and not finished. The working season in which this money is to be expended will begin next spring.

SUPPLIES AND APPLIANCES.

Mr. SMITH. For tools and electrical and engine supplies and appliances to be furnished for the use of troops using gun and mortar batteries. We cut $10,000 off this item last year. You think that will only last you until after March.

Colonel ABBOT. Yes, sir. I have been holding back as much as I could on requisitions. We have refused to furnish a great many things which under ordinary conditions we would have gotten. We have been endeavoring to keep expenditures down, but this particular appropriation furnishes the supplies for a great many electric lighting and power plants all over the country; they require a certain amount of supplies, such as piping, hose, lamps globes, fixtures, switches, fusible wires, etc., for their operation, and they must go without when the money goes. To keep things running as they should and would if they were commercial plants requires the full amount of $40,000 per annum. We did not have anything left over when we had that sum, and there were no lavish expenditures.

Mr. SMITH. Do you attempt to keep equally supplied in this respect with electrical devices for guns in and out of condition.

Colonel ABBOT. No, sir; not by any manner of means. For instance, at Fort Jackson the electric-lighting plant has not cost a cent for the past five years. It has been slushed with oil, etc., and nothing has been spent on it. This is not quite a fair case, however, for the artillery rules very wisely require that any battery out of commission shall have its electric-lighting plant operated once a week. At Fort Jackson that has been impossible because there are no troops there. I believe that plant, however, is now in good condition, except the steam boiler, which is undoubtedly useless now.

Mr. SMITH. Now you have electric lights at each gun and, I suppose, at each magazine, so as to be able to use them at night.

Colonel ABBOT. When the present system is completed there will be four to six lights on each gun carriage. Then, on the loading platform there is just enough light to produce a sort of twilight effect, so that the men will not run into each other, but no general illumination to serve as a target to the attack or blind the gun pointers. The ammunition hoists are brightly lighted up, and so are the magazines and projectile rooms. Also, lights are supplied in the fire-control stations for the wires in the instruments, and the platting rooms are brightly illuminated. Electric lights in all these places are needed. Power is necessary for operating the shot hoists and retracting motors. The electrical installations now in place are not anything like complete. The need for electrical appliances has grown very largely. There are few batteries to-day where we can light all the lights and run the power appliances at the same time. They have to be replaced in many cases by larger plants, using the present plants for smaller batteries than they now serve.

Mr. SMITH. Down until 1904 you only got $25,000 a year for this purpose?

Colonel ABBOT. The larger electrical plants have been put in since then.

Mr. SMITH. So that the increase in electrical output is greater than the increase between $25,000 and $40,000?

Colonel ABBOT. It is.

SEA WALLS AND EMBANKMENTS.

Mr. SMITH. For the construction of sea walls and embankments you ask the same amount we gave you last year. The Secretary of War has reduced it?

Colonel ABBOT. He has.

Mr. SMITH. You gave us last year a list of the works of this character that you were advised ought to be attended to in the order of their urgency?

Colonel ABBOT. Yes, sir.

Mr. SMITH. Have you allotted the $50,000 we gave you last year?

Colonel ABBOT. No, sir; because the damage done at Fort St. Philip and at Forts Morgan, Gaines, Pickens, and McRee were so great that the $50,000 we had was nowhere near enough to repair them. Out of that sum we now have $36,529.86 held up for emergencies, as you suggested last year we should do.

Mr. SMITH. Have you on that list the places requiring this work in the order of their importance?

Colonel ABBOT. I have them arranged geographically, but not in the order of their importance. There is no item on this list which it would not be well to do. None of them are extremely urgent, but all are desirable.

Mr. SMITH. Would you say that they would suffer seriously?

Colonel ABBOT No; all of them could go two or three years, probably. We have one battery on the Pacific coast where the sea has cut away part of the parapet at one place. The washing may stop there four or five years. We may get along there safely without any serious damage, but one storm may wash out the battery. It is a small one and did not cost a great deal originally, however.

Mr. SMITH. At what places is it seriously wearing where the Government owns the ground?

Colonel ABBOT. At New Bedford part of the battery parapet has caved in.

Mr. SMITH. Did you know about the emergency before it caved in?

Colonel ABBOT. No, sir; a storm came along and happened to hit right there.

Mr. SMITH. Is there any other place where the land has been cut away seriously?

Colonel ABBOT. Two years ago I spoke of Fort Terry. Then there is a place at Fort De Soto, Tampa Bay, I have been watching, where the island has been cut in two, but it is a pretty large island. The gap is now about 1,500 feet wide. I think it is nearly stable now, and if it gets no wider no serious harm has been done. We are watching matters of that kind, and we do not spend money unless it is necessary.

TORPEDO STRUCTURES.

Mr. SMITH. For the preservation of torpedo structures erected for the defenses of the United States, how many torpedo structures are there?

Colonel ABBOT. A great many. At each place where there is a torpedo station there is a casemate and storehouse and cable tank and two or more torpedo position-finding stations, as well as torpedo cable terminal structures. There must be wharves and all sorts of auxiliary small structures, like tide gauges, etc., all of which require repairs to keep them in order.

Mr. SMITH. I will ask you in a very general way to explain the growth of these structures in number and quantity since the torpedo work was turned over by the engineers to the artillery.

Colonel ABBOT. The number has increased.

Mr. SMITH. Are not the torpedo structures almost all new since the transfer to the artillery?

Colonel ABBOTT. Yes, sir. Very nearly all we turned over to the artillery were in their opinion insufficient and new ones have been built in most places.

Mr. SMITH. They are then only four or five years old.

Colonel ABBOTT. Many are made of corrugated steel and rust quickly.

Mr. SMITH. Have they been kept painted?

Colonel ABBOTT. Yes, sir; that should all be paid for out of this appropriation. This item would be used for painting and keeping up

the roofs and sides of these sheet-iron structures. They are cheaper to build than anything else. They are drier than brick structures, which later are rather damp on the seacoast, but it does take money to keep them painted and in serviceable condition.

Mr. SMITH. Have you kept them painted with the $10,000 given you last year?

Colonel ABBOTT. We did not get it until June 25 last.

Mr. SMITH. Don't you think that amount will be sufficient to keep them all painted?

Colonel ABBOT. I doubt it. We will try, and if it is not enough we will come back for more money. It is almost impossible to make a definite estimate when things are new, but more will be required each year as they get older.

Mr. SMITH. In 1906 you had nothing at all—nothing until last year.

Colonel ABBOT. We were then beginning to encroach upon the appropriation for "construction." As long as things could be kept up without too heavy charge on general construction accounts, I did not think it necessary to come to Congress.

Mr. SMITH. You have to paint them frequently, do you not? How much has the painting of old structures cost in the past?

Colonel ABBOT. We paint frequently. The work has not been differentiated at all, and we could not tell whether expenditures were made for painting new buildings or old. Of course Congress ought to know where the money goes, and how it has been spent; we always try to make the facts appear, that is, we try to let you know that it is costing you so much to keep in order that which has been built, and that we are spending so much for what is being built new.

Mr. SMITH. But you would not pay for painting the original buildings out of a construction fund——

Colonel ABBOT. There is painting going on all the time.

Mr. SMITH. You did not mean that the construction is such that in each locality they each ought to be painted every year?

Colonel ABBOT. No, I think not; but we are getting requisitions to paint this and that, and there is some painting and fixing up going on all the time. To show how we divide this last appropriation of $10,000, we gave $400 to Portland, Me. They have there four different forts in the harbor, and that would be, say, $100 to a fort, and at each fort there was, say, two or three of those buildings. Some of them are 100 feet long, with very large roofs. One hundred dollars worth of painting does not go far on a building of that kind, made of corrugated steel.

Mr. SMITH. As a matter of fact you have not much of an idea as to how much of this paint the old buildings will take?

Colonel ABBOT. No, sir; not much. When we come to the end of this year and see in what shape the buildings are and how much we have spent, we can tell better next year. There is also another question. For instance, in San Francisco harbor the defenses are practically finished, but we must keep at that harbor some kind of an organization to keep them in repair, which involves a certain amount of disbursing and a certain office force to attend to the fortification work. That means that at each one of those forts there must be someone, perhaps a fifty or a sixty dollar-a-month man to go around and see what requires fixing up. All of this and the costs of hiring a few

men from time to time costs a certain amount of money, which has to be paid out of the fund for preservation and repair of batteries and preservation and repair of torpedo structures. The more nearly completed we get the system, the greater proportion of such expenses has to be charged to this fund purely for the keeping up of what is already in place.

CONSTRUCTION OF MINING CASEMATES, CABLE GALLERIES, ETC., AND PURCHASE OF SEARCHLIGHT OUTFITS FOR SUBMARINE MINES.

Mr. SMITH. The next item is for the construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories and the purchase of searchlight outfits for submarine mines. In this item you ask for the insertion of the words "And the purchase of searchlight outfits for submarine mines," as distinguished from the general appropriation for searchlights which we have always given here.

Colonel ABBOT. That was introduced, I think, at the request of the Chief of Artillery.

Mr. SMITH. We interrogated him about searchlights; and so far as you are concerned you have nothing further to say about it?

Colonel ABBOT. Nothing further to say.

Mr. SMITH. As I understand the Chief of Artillery, no searchlights for the submarine mines had ever been procured since the turning over from your department of the submarine-mine defense and the torpedo defense to the artillery.

Colonel ABBOT. We have supplied the artillery with searchlights for any use they choose to put them to, but there has been no distinct submarine searchlights ever turned over to them for exclusive submarine-mine use.

Mr. SMITH. During the time that you had charge of the torpedo defense, whatever searchlights you used and turned over with the torpedo defense to the artillery you acquired under this general language: "For purchase and installation of searchlights for the defense of our most important harbors?"

Colonel ABBOT. No, sir. Searchlight appropriations under that heading began only in the act of June 6, 1902. I think, in 1898, under the war defense act, they were issued for the first time to the different harbors. They were put in for the emergency.

Mr. SMITH. You say that you had no searchlights for the use of the submarine defense until the emergency fund of 1898?

Colonel ABBOT. Yes, sir; those were the first regular issues.

Mr. SMITH. And have never gotten any since?

Colonel ABBOT. No; we had some experimental lights. The matter had been developed at the engineer torpedo school, so we knew what we wanted, but they had not been purchased and issued; the appropriations had been exceedingly small and were mostly applied to getting cases and cables, and building casemates, etc.

Mr. SMITH. As it appears that modern and most approved searchlights for important points are 60-inch lights, and that a number of 36-inch lights now in use at the fortifications should, from time to time, be replaced with 60-inch lights; and inasmuch as it further appears that 36-inch lights are adequate for submarine defenses, why would it

not be best to continue to buy all searchlights under one heading, and then transfer from the fortifications the 36-inch lights to the submarine mines as fast as you could replace them with 60-inch lights at the fortifications proper?

Colonel ABBOT. I see no objection to that at all.

Mr. SMITH. If we put this language in with reference to the submarine mines, it would prevent that transfer and result in going ahead and buying new 36-inch lights, and as fast as we substitute 60-inch lights at fortifications we would have the 36-inch lights on our hands?

Colonel ABBOT. Yes, sir; I think there was perhaps a suggestion at the time that wording was brought up that it would be well to secure jurisdiction of the torpedo branch of the artillery service over certain lights, so that in an emergency they could not be taken away, leaving the torpedo branch without lights while the guns had them. There may have been some idea of that kind.

Mr. SMITH. After you have turned over a 36-inch light to the artillery for use in submarine mines, it is pretty hard for you to get it back without their approval.

Colonel ABBOT. It would be pretty hard, but we have had no trouble; the Chief of Artillery is always ready to make any transfers of lights that we ask.

Mr. SMITH. Under this head you ask for $350,000. If the committee saw fit to proceed more slowly in the perfection of the artillery plans of the submarine defense, and so reduced the amount asked for for mines and the like, would it be proper to make a pro rata reduction in this item? In other words, is the estimate for submarine mines and the like balanced in any way with your estimate for emplacements, and so forth?

Colonel ABBOT. Yes, sir; the amount submitted by the Chief of Engineers annually was balanced with that submitted by the other departments, but not as it was submitted in the Book of Estimates. The estimate therein submitted by the Secretary was reduced in his office, and I do not know how the Engineer reduction compares with the reduction in the other item.

The Chief of Artillery has prepared estimates of the cost of the torpedo structures needed to complete the defenses of the United States, amounting to $1,352,819; his estimates for the submarine mines and appliances to operate them, required, amount to $1,825,835. His total estimate for the work of both departments is therefore $3,178,654. Taking these estimates as a basis, it could be assumed that the work of the Engineer Department (the torpedo structures) would require 43 per cent and that of the Ordnance Department (the mines and appliances) 57 per cent of the total cost of completing the torpedo defenses of the United States.

FORTIFICATIONS IN INSULAR POSSESSIONS.

CONSTRUCTION OF SEACOAST BATTERIES.

Mr. SMITH. We will now turn to page 18. What is the total estimate for the completion of seacoast batteries at Guantanamo, Cuba?

Colonel ABBOT. For the engineering part of it alone, $1,020,000.

Mr. SMITH. Are your figures based upon the estimates of the Taft board?

Colonel ABBOT. Yes, sir; that is, our project that we are working on is in accordance with the Taft Board project.

Mr. SMITH. You have adopted the same estimates.

Colonel ABBOT. Yes, sir; the Taft Board estimates were based upon estimates prepared by the Engineer Department, the Signal Corps, and the Ordnance Department, and to correspond with the armament determined by the Taft Board.

Mr. SMITH. You have had nothing at Guantanamo except an allotment from a general appropriation for insular possessions.

Colonel ABBOT. That is all; about $180,000.

Mr. SMITH. That has never been expended.

Colonel ABBOT. Yes, sir; the batteries are finished, very nearly.

Mr. SMITH. What batteries?

Colonel ABBOT. There are four 15-pounders at Fishermans Point, and four 6-inch guns at Condé Beach.

Mr. SMITH. What has the Government done for the Navy Department, that you know of now, at Guantanamo?

Colonel ABBOT. As to the appropriations, I do not know.

Mr. SMITH. Then the Government practically has nothing to defend, has it?

Colonel ABBOT. I do not know, sir. They have had some appropriations, but what they have spent I do not know.

Mr. SMITH. Do you have any knowledge of any real necessity for the fortifications at Guantanamo at present?

Colonel ABBOT. I think it is important to have a safe place on the island of Cuba that the naval fleets can enter when they find it necessary.

Mr. SMITH. What could they do if they got in there, except to stay there? There is nothing there.

Colonel ABBOT. They have had a large number of naval boats there, and they have proposed to make it a depot; but what they have actually put in I do not know.

Mr. SMITH. They have no dry dock there, or anything of that kind?

Colonel ABBOT. No, sir; but th y have coal-handling machinery there, I think, and a considerable coal pile, and that would be a good thing to have there if coal was needed.

General MACKENZIE. The Naval Board considers it one of the most important points as a defense post; they consider it so important that probably they can abandon Key West.

Mr. SMITH. That is, if Congress should provide for building up the navy-yard to a naval station. But the query is, Do we want to put in fortifications if the Naval Committee are not going to give them anything with which to establish a naval base? If we are going to have something to defend, we are ready to give the money to defend it.

Colonel ABBOT. The original board that sat on Guantanamo defense recommended that expenditures be made in proportion to what the Navy spent. Our idea is that this is what has been done—that is, our small guns and a set of mines compare well with the coal pile, etc., the Navy has put in, as far as we actually know. The mine and torpedo buildings are all built. It is a very small defense, but, as near as we can see, we are keeping up about in proportion to what the Navy tell us they have in there.

Mr. SMITH. You would not think that a battery of fifteen-pounders was very pretentious?

Colonel ABBOT. No; but it would prevent rapid thin-hulled torpedo boats from rushing in and setting fire to a lot of coal, which might be a really serious disaster in case the Navy was depending upon it.

HONOLULU AND PEARL HARBOR.

Mr. SMITH. At Honolulu and Pearl Harbor, I believe, it was stated that a portion of the defenses would be sufficient for both places, was it not?

Colonel ABBOT. Mortars placed between the two have sufficient range so as to cover both entrances, so far as a mortar fire goes.

Mr. SMITH. In what state of advance are the batteries at Honolulu?

Colonel ABBOT. There has never been any allotment there as yet; we have bought land, and that is all.

Mr. SMITH. You have not even gotten sufficient money yet to buy the required land, have you?

Colonel ABBOT. Not all of it; no, sir. We have some land there on which we could emplace 12-inch rifles for either Honolulu or Pearl Harbor, but of course the same rifles would not answer for both. We have a site for a mortar battery that would defend Honolulu Harbor very nicely, but the site which would defend both Pearl Harbor and Honolulu Harbor we have not yet been able to acquire with the money we have had.

Mr. SMITH. You never have gotten any allotment at all out of this gross sum for the insular possessions.

Colonel ABBOT. We never made any allotment there. The last appropriation of $260,000 for batteries in the Hawaiian Islands has not yet been allotted, till the question of the best sites was more carefully determined.

Mr. SMITH. You have had an allotment for Manila.

Colonel ABBOT. Oh, yes.

Mr. SMITH. And quite a considerable one?

Colonel ABBOT. Yes, sir. Manila and Subic Bay have received all excepting that $180,000 that went to Guantanamo and the $260,000 that was appropriated last year for Honolulu, none of which has yet been applied.

Mr. KIEFER. Do you mean allotted when you say applied?

Colonel ABBOT. Two appropriations were made for the insular possessions in a lump sum. Of that, we allotted a certain amount to Guantanamo, a certain amount to Manila, and a certain amount to Subic Bay; but the last session of Congress appropriated $260,000 for Pearl Harbor and Honolulu defenses, and we have not yet started work under that $260,000.

Mr. KEIFER. Do you mean you have not yet made any allotments? When you say it is not applied, do you mean the same thing as allotted?

Colonel ABBOT. Yes, sir; we could not apply it unless it had been allotted. The law specified it was for the Hawaiian Islands.

Mr. SMITH. I think you are slightly in error as to the reading of last year's law. Last year's law, as it finally passed, appropriated $260,000 in gross for seacoast batteries in the Hawaiian Islands.

Colonel ABBOT. We have not touched any of that $260,000.

Mr. KEIFER. That covered Pearl Harbor.

Mr. SMITH. Of which this committee granted $200,000 for the Hawaiian Islands; so that when you said that you never had had any

appropriation for Honolulu and Pearl Harbor, you didn't take into consideration this $260,000 carried from last year's bills.

Colonel ABBOT. It had escaped my mind temporarily.

Mr. BRUNDIDGE. How much money has been expended at Subic Bay?

Colonel ABBOT. There is now left (on the 30th of November) out of the allotment for Subic Bay $345,000. There has been about $48,000 spent in Subic Bay up to September 30, 1906, in work actually at that end of the line, and in purchasing supplies in San Francisco about as much more. About $84,000 has been spent there, approximately.

Mr. SMITH. A year ago your department gave us the amount of all prior appropriations that had been allotted to Guantanamo, Manila, and Subic Bay. As I understand you, only a small portion has been spent of that allotment at Guantanamo.

Colonel ABBOT. No, sir; about $180,000 was allotted to Guantanamo, and that is pretty nearly all spent. It will complete the 3-inch and 6-inch batteries that are started.

Mr. SMITH. And nothing more?

Colonel ABBOT. Nothing more.

Mr. SMITH. Of the amount allotted to Manila how much remains on hand, exclusive of last year's appropriation?

Colonel ABBOT. Of the total amount, $1,400,000—there were two appropriations of $700,000 each—there is left now available for expenditure $761,000, divided up between Guantanamo, Manila, and Subic Bay, and certain purchases made in this country of machinery for use over in the Philippines. At Guantanamo the balance is $30,000; at Manila Bay, $383,000; at Subic Bay, $340,000, and in this country, for purchases for use abroad, $2,000. The above are in round numbers.

. . .

CONSTRUCTION OF FIRE-CONTROL STATIONS AND ACCESSORIES.

Mr. SMITH. Before going into the details of this fire control, I would like to call your attention to the fact that in the inception of the fire-control system of the continental United States it was the practice to make separate appropriations for the Engineers, the Ordnance and the Signal Corps; and it was found that Congress had erred in balancing these appropriations, consequently it was deemed wiser to make a gross appropriation, and have the Secretary of War so divide it as to keep the departments properly balanced in their allowances. Now you ask a large appropriation for the Engineers Department separately for the insular possessions. Is there any reason that led Congress to adopt the other system with reference to the continental United States that is not equally applicable to the insular possessions?

Colonel ABBOT. No, sir; there should be the same system in both cases. The only thing is this, that there is nobody else over there now but ourselves, and the artillery have been quite anxious that the initiation and the building of the fire control should go along with the batteries if possible. We have made a report on the fire control of the batteries on Corregidor Island in Manila Bay, which was approved practically by the Chief of Artillery about a year and a half ago, but we have not been able to build anything there, of course, lacking applicable funds. We simply put in an estimate to enable us to carry

out the general principles urged by the former Chief of Artillery that the batteries and fire control should go along together.

Mr. SMITH. Is there any item in the bill for the other?

Colonel ABBOT. We put in an estimate in our annual report of $752,000 to cover the cost of the engineer work. Of this, $196,000 was for Guantanamo; $169,000 for Pearl Harbor; $329,000 for Manila, and $161,000 for Subic Bay. Those figures are taken simply, as the other estimates which were put in at the request of the Chief of Artillery, from the report of the Taft Board. That board specified certain structures that would be needed; we estimated how much those would cost, and those are the figures on which we base our present estimates.

The Taft Board estimate for fire control for all batteries projected in the insular and isthmian canal ports was as follows:

Guantanamo	$280,606
San Juan, P. R.	197,621
Panama Canal entrances	435,166
Pearl Harbor and Honolulu	320,656
Guam	129,561
Manila	561,086
Subic Bay	243,391
Kiska Island	162,636
	2,330,723

This included estimates as follows for the engineer work involved:

Guantanamo	$209,100
San Juan, P. R.	155,200
Panama Canal entrances	347,600
Pearl Harbor and Honolulu	241,500
Guam	89,200
Manila	424,400
Subic Bay	181,600
Kiska Island	116,800
(Based on detailed estimates)	1,765,500

The portion of the total estimate which was for work of the Ordnance Department was $195,168.75 (figures obtained from the Chief of Ordnance); the portion for the work of the Signal Corps was $370,054.25 (obtained by deducting sum of Engineer and Ordnance estimates from the total Taft-Board estimate), making the total estimate $2,330,723 (p. 24 of Taft-Board report).

The figures above indicate as clearly as any data available the relative cost of the work of the three departments involved in the new fire-control installations—that is, 75 per cent for the Engineer Department, 8 per cent for the Ordnance Department, and 16 per cent for the Signal Corps.

The estimates submitted by the Chief of Engineers for work that could be advantageously done next year was as follows (for engineer work):

Guantanamo	$96,480
Honolulu and Pearl Harbor	165,120
Manila	329,480
Subic Bay	161,280
	752,360

Taking the above apportionment of cost as a basis, the amount to cover the needs of all three departments for the work contemplated in the estimates of the Chief of Engineers would be to the above amounts as 75 to 100, or the following amounts:

Guantanamo	$128,640
Honolulu and Pearl Harbor	220,160
Manila	439,287
Subic Bay	215,040
	1,003,127

Mr. SMITH. Then there is not a dollar spent by the Ordnance Department for its portion of the fire control for seacoast fortifications proper in the insular possessions as distinguished from the submarine defense.

Major ABBOT. I do not know of any, sir. As to which class of fire-control work should precede in this country, I will say that where we have the provisional fire control probably the purchase of instruments is better than to put the money into buildings, but where you are in a position like Corregidor Island, where there is no fire control, and where there is no means for any sort of range finding, the guns would be operated at an extreme disadvantage, unless the Engineer Department should go ahead and build something within which the artillery could operate. I should state that the ground there is very difficult to get over, and the woods are almost impassable jungles. It requires roads, for the ground is very steep and in places extremely rocky. There would be much timber cutting to be done before any system could be constructed, for it is necessary to see before the exact sites are selected. A large sum of money must be spent before the system could be introduced.

Mr. SMITH. I understand that before this modern system of fire control came into existence for twenty-five years observation stations have been established, base lines established by ordinary transits, and that by their use and triangulation the old guns have been used with a certain kind of fire control.

Colonel ABBOT. They have been theoretically used, but I do not know where they have been actually used.

Mr. SMITH. I tried to convince the Chief of Artillery yesterday that this system was new, and he insisted that it was only an improvement over that used in the early eighties.

Mr. KEIFER. The triangulation, he said, was not new.

Mr. SMITH. You speak now of being compelled to work the fire-control system simply by standing at the breach of the gun. As a matter of fact, they used a system of triangulation by using transits and determining the angles in that way before you had any modern system of fire control.

Colonel ABBOT. Indirect fire so directed was used in sieges, but they would shoot exceedingly slow and could not follow moving targets.

Mr. SMITH. I wanted to get this cleared up; we seemed to misunderstand it yesterday.

Now, I was not asking you as to which work ought to precede the other. It is a fact, is it not, that these delicate instruments for fire control are slow of manufacture?

Colonel ABBOT. Yes, undoubtedly; but I believe that they had a large surplus on hand over what was in use; that is, the Ordnance

Department at one time was away ahead of our buildings in the supply of instruments, I think.

Mr. SMITH. So that after we got all of your buildings up we would not be any further advanced, unless we had these instruments, than we are now; so the question is whether large appropriations should be made for buildings in the absence of applications for money for equipment of these buildings.

Colonel ABBOT. There is one thing, the instruments can be stored a good deal safer than the buildings. The buildings must be looked after, the roofs painted, windows mended, etc., while the instruments can be kept in a storehouse.

Mr. SMITH. Suppose we have no instruments?

Colonel ABBOT. Then the buildings are of no use.

Mr. SMITH. Only the expense of maintenance.

Colonel ABBOT. Yes, sir.

Mr. SMITH. Do you understand that they have those instruments on hand?

Colonel ABBOT. I think so, to a considerable extent, for the continental United States they had a great many more instruments available than we had houses the last time I talked with them on that subject; but that was perhaps two years ago.

Mr. SMITH. How long does it take to obtain them if they have to obtain them by contract or by order?

Colonel ABBOT. I have no means of knowing. The Warner-Swayze people manufacture them.

Mr. SMITH. When you say that they were largely in advance of you, do you not mean that they were in advance of you in that they had the instruments for the provisional fire control?

Colonel ABBOT. They had instruments before we had houses to put them in.

Mr. SMITH. Did you understand that they had large quantities of those instruments stored as distinguished from the use in the provisional fire control?

Colonel ABBOT. We have not made any distinction. We have been building similar buildings, some were called temporary, some were called provisional, and some standard, but we do not know which are which. The later buildings are more fireproof and are better adapted to the latest developments in the way of speaking tubes, telephone booths, latrines, washing equipment, etc.

Mr. SMITH. To what extent have you applied the appropriation we have given you to buy land for a Hawaiian site, or have you been brought to a standstill by reason of the exhaustion of your money?

Colonel ABBOT. We had been brought to a standstill when the act of June 25 gave us an additional $150,000.

Mr. SMITH. That is, have you been banking this money or spending it?

Colonel ABBOT. Not the last appropriation. We had spent all that we had received up to $150,000. The last has not been spent.

Mr. SMITH. Why, in brief, has it not been spent?

Colonel ABBOT. We have been waiting for the determination as to just where the best sites for the batteries should be. There has been some discussion on that matter, and we do not want to buy any further land until we find out exactly where we should go.

Mr. SMITH. What have you to say as to whether the amount we have given you will not be sufficient to pick out and buy the land you require at a definite price, or within the next year?

Colonel ABBOT. General Mackenzie can answer that better than I can, as he has been over there.

General MACKENZIE. There is one piece of land which we undoubtedly will have to buy, and which a year ago was $25,000. Whether the price will vary very much from that I do not know. There is another piece of land where we have not yet succeeded in making an arrangement—that is, we have not got a price on it yet; but I think that with this amount we have we can pull through for the next year.

Mr. SMITH. And it probably would not delay your work?

General MACKENZIE. I think not, unless we have an unusual amount of work.

Colonel ABBOT. We have land enough now on which to spend $200,000 out of the $260,000, so that the land and the money are on all fours.

Mr. SMITH. It might be well to buy the land fairly speedily, but from what I understand you have not located the land, nor have you a definite price on it.

Colonel ABBOT. There have been different opinions as to that mortar-battery site. There is quite a degree of variation that is possible and still have an effective position. As to just which is the best location there has been much discussion and a great deal of variance of opinion.

Mr. SMITH. You never have asked for searchlights for the seacoast batteries of the insular possessions, have you?

Colonel ABBOT. Not yet; we have not got far enough along.

Mr. SMITH. Do you need fire control when you say you do not need searchlights?

Colonel ABBOT. Well, the enemy may come in in the daytime. The searchlights are something that can be put up by contract in large numbers. Getting the houses built, the stations picked out, and the roads all built are a slow and difficult thing in a rainy country like the Tropics.

Mr. SMITH. You say that these 60-inch searchlights are such a stock article that you can buy them when you want them?

Colonel ABBOT. The General Electric Company bid to get out a 60-inch searchlight in three months for the first delivery, and about every five weeks after, or something like that, several years ago, if I remember correctly. The mirrors were made only by a German firm for a while, but now several people are manufacturing them, so that we can get them much more rapidly.

Mr. SMITH. Will you need seachlight outfits for the submarine mines in the insular possessions before you need searchlights at the fortifications?

Colonel ABBOT. It depends on whether we build submarine structures there or not. We haven't those yet; but submarine mines can be put down with less preparation than guns can be mounted; when they go in there ought to be searchlights available, undoubtedly.

CONSTRUCTION OF STRUCTURES FOR OPERATION, PRESERVATION, AND CARE OF SUBMARINE MINES AND ACCESSORIES FOR GUANTANAMO BAY, MANILA, AND SUBIC BAY.

Mr. SMITH. In the estimate which you make on pages 19 and 20, of $382,500, what amount, if any, is for searchlights?

Colonel ABBOT. Those were put in just like the others, at the request of the Chief of Artillery, and were obtained from the Taft Board estimates

Mr. SMITH. Then you can not give me the amount in this estimate that is for searchlights?

Colonel ABBOT. No, sir; those estimates were made at Fort Totten, at the torpedo school, I think, and we adopted the figures given by the Taft Board.

Mr. SMITH. Do you care to say anything further with reference to this estimate for construction of structures necessary for the operation, preservation, and care of submarine mines and their accessories?

Colonel ABBOTT. No, sir; I think not.

Mr. SMITH. The estimate you ask here is for the completion of the engineering work at these places, is it not?

Colonel ABBOT. Yes, sir; the submarine defense of Manila will cost $709,000 for structures and materials. I do not think the estimate submitted by the Secretary of War was as much as that. That was the total cost of the defenses as given by the Taft Board.

Mr. SMITH. The engineer estimate was originally $371,500.

Colonel ABBOT. That is about the right proportion of the total.

Mr. SMITH. And has now been changed to $382,500; so you ask us to give to the insular possessions what we have never given to the United States proper—a complete and perfectly equipped submarine system in one year.

Colonel ABBOT. That is what we asked for the United States also in the annual report, but the Secretary of War did not carry out the suggestion in this country. The Secretary of War submitted the insular estimate in toto and reduced the home estimate. In our annual report we submitted the total estimates to complete the torpedo defenses, both in this country and in the insular possessions, at the request of the Chief of Artillery.

Mr. SMITH. So if we decide to build these, as we have in the United States, we would make the necessary prorata reduction, both in your items and in the submarine mines and the like.

Colonel ABBOT. Yes; they can always be balanced, because we can build storehouses enough to carry any mines we have built with a small proportion of the appropriation, and then build as much of the rest of the buildings as the money will permit. They can not use the mines until the buildings are completed, but there will be no inconvenience if there was no occasion to operate the mines. We could provide storage with a small proportion of the money.

Mr. SMITH. If I recall aright, that covers all the items of your department in the bill, does it not, Colonel?

Colonel ABBOT. Yes; that is all we ask.

Mr. SMITH. General, is there any statement you would like to make further on the matter?

General MACKENZIE. No; I do not think there is. In the matter of the work in the insular possessions the Secretary seemed to be thor-

oughly impressed with the desirability of having it as large as practicable and reducing, if necessary, the items in this country.

Mr. BRUNDIDGE. Reducing what, General?

General MACKENZIE. Even reducing the provision for the work in this country in order to increase the work in the insular possessions, in the interviews we had, in going over the estimates.

Mr. SMITH. This can be said of that theory, General, that while it was estimated by the Artillery that it would cost about four million dollars to complete the submarine defense of the United States, that was after a very large amount of expenditure had already been made on the submarine defense of the United States by the engineers. Is that correct?

General MACKENZIE. Yes.

Mr. SMITH. It is also true, is it not, that the fortifications are in a far less advanced stage in the insular possessions than in the continental United States?

General MACKENZIE. O, yes, sir.

Mr. SMITH. And therefore it might be necessary more rapidly to push the submarine defense there, in the absence of more adequate coast fortifications?

General MACKENZIE. Yes.

Mr. SMITH. Are those the principal reasons why the submarine defense should be pushed more rapidly in the insular defense than at home?

General MACKENZIE. I should judge that was the principal reason. You know the matter has been discussed as to the application even of some of the contingent funds of the War Department. That has been discussed from time to time in the War Department; that idea was indicated.

Mr. SMITH. Was there anything further, Colonel Abbot, that you had to suggest?

Colonel ABBOT. No, sir; I have nothing further to suggest.

FRIDAY, *December 7, 1906.*

SIGNAL CORPS.

STATEMENT OF BRIG. GEN. JAMES ALLEN, CHIEF SIGNAL OFFICER.

FIRE CONTROL.

Mr. SMITH. General, have you any items in this fortification bill that you are interested in, except in the various items for fire control?

General ALLEN. I have an undivided interest in the fire-control estimate for $1,800,000 there.

IN THE INSULAR POSSESSIONS.

Mr. SMITH. A large estimate has been made here by the engineers for fire control in the insular possessions, which estimate is supposed to go to the Engineer Department alone.

General ALLEN. The whole item for the insular possessions that we have estimated for would not exceed $1,500. Of course it is all in one item. I have nothing for my department in it that would amount to anything.

Mr. SMITH. As I remember, your department is not a large purchaser of material in connection with the fire control, is it? It is largely an installer, is it not?

General ALLEN. Oh, yes; we furnish a good deal of material.

Mr. SMITH. What do you furnish?

General ALLEN. All the wire and cables, and all the electrical apparatus—everything connected with the fire control—all the instruments. Cables alone are a large item. They are very expensive.

Mr. SMITH. When you say you furnish cables, you do not mean that certain cables connected with it are not also furnished by the Engineer Department?

General ALLEN. We furnish nearly all fire-control cables. Between Fort Wadsworth and Fort Hamilton we have 150 wires.

COOPERATION WITH THE ENGINEERS.

Mr. SMITH. It is a fact, is it not, that many of the conduits are used jointly for your cables and for the cables of the engineers?

General ALLEN. The engineers put in all the conduits and pull in our cables.

Mr. SMITH. Have you not at times made a sort of arbitrary division between the cables when used jointly? You build a certain distance and they build a certain distance?

General ALLEN. They put in the power stations, the dynamos, and they deliver us power at certain points. They give us power, whether alternating or direct.

Mr. SMITH. If that power was to be delivered to you at a specific point, you would build to that, and the engineers would build from the source of power to that point?

General ALLEN. Yes. They put in the plants.

Mr. SMITH. So that in that way you sometimes divide the cost of the cable at some fixed point?

General ALLEN. Yes.

Mr. SMITH. Suppose they got a power plant, and they are to deliver you the current at a certain point. They furnish you the cable to that point and you furnish it beyond that point, although it is practically all one cable and carries the current from the source of power to the various divisions?

General ALLEN. Yes; for instance, we will wire up to the gun and the Ordnance Department will do the rest of it. It is very nicely divided.

Mr. KEIFER. There is no conflict about it?

General ALLEN. No, sir; when a new item comes up it is sent around to everybody and the question is asked, "Who will do this?" One will say, "It is more in your line than in mine and you had better attend to it."

Mr. KEIFER. So that there is no conflict between you about it?

General ALLEN. No, sir.

TREASURY BALANCE FOR FIRE CONTROL.

Mr. SMITH. What is the amount of your Treasury balance for fire control from the allotment of your gross appropriation and the allotment from the separate appropriations that were formerly given you?

General ALLEN. We have about $257,000.

Mr. SMITH. That is what you have got allotted or unexpended?

General ALLEN. It is allotted to us, and not spent.

Mr. SMITH. Is it allotted by you?

General ALLEN. No; by the Secretary of War.

Mr. SMITH. After you have it allotted to you, you then allot it?

General ALLEN. It has not been drawn out of the Treasury yet.

Mr. SMITH. So that all the money you have received you have allotted to specific work?

General ALLEN. Yes; to specific work.

Mr. SMITH. And how much do you say is your Treasury balance?

General ALLEN. I do not think I can give it to you accurately offhand. The last item we got this year was very late in coming. We had altogether $323,000. We received $117,000 early in the summer in order to keep up things, and later on we got the balance, $206,000. Of that $206,000, very little has been spent, but that is all allotted for the work, and there are prospective obligations against all of it. For instance, some of that money has gone to the Pacific coast. I suppose there is in the Treasury, perhaps, $250,000, because we have not expended all of that $117,000, the original allotment. That was for fixed expenses and maintenance.

Mr. SMITH. So that you can not tell us what you have left in money?

General ALLEN. I can give that to you in the morning, or I can send it down to you by telephone this afternoon.

Mr. SMITH. I will ask you to state what the Treasury balance is to the credit of the Signal Corps from all prior appropriations and allotments for work on the fire-control system.

General ALLEN (stated later). The Treasury statement of this date shows the amount to be $322,142.57.

Mr. SMITH. The allowance to your branch of the service last year, you say, was something over $300,000?

General ALLEN. Three hundred and twenty-three thousand dollars.

Mr. SMITH. So that you go very close to half of the entire appropriation for the service?

General ALLEN. Yes.

Mr. SMITH. In the previous year your branch got $410,000 out of a million dollars?

General ALLEN. Yes.

Mr. SMITH. So that you got a larger percentage this year than formerly?

General ALLEN. Yes. That $410,000 was out of an appropriation of a million dollars, and you will remember that year, Mr. Smith, we had the maneuvers, which were a very expensive affair.

STATUS OF FIRE CONTROL IN THE UNITED STATES.

Mr. SMITH. Now a year ago General Greeley testified that it would take $21,000 to complete the temporary installation of fire control throughout the United States. I will ask you to state whether temporary fire control is now complete throughout the United States?

General ALLEN. No, sir.

Mr. SMITH. Where is it lacking in completion?

General ALLEN. The partial installations are to be completed principally at Fort Morgan, Forts St. Phillip and Jackson, Fort Barancas, Fort Rosecrans, Cal., Forts Stevens and Columbia. At the four first-named places much work must be done over on account of the destruction caused by the recent Gulf storm. We call them "partial" now. Somebody objected to the word "temporary." They are not in fact temporary; they are permanent, except that the wires are overhead and must be put underground.

Mr. SMITH. All the stations and buildings are not permanent as yet, are they?

General ALLEN. As far as they get them in.

Mr. SMITH. You have a provisional system in many places where you have not got permanent buildings, have you not?

General ALLEN. No; the partial system is just as complete as the rest of it. As far as it goes, the whole thing will stay just as it is, except for the overhead wires.

Mr. KEIFER. Except the overhead wires?

General ALLEN. Yes; when we put in partial installations we put them on poles instead of putting them in conduits underground. That is a very expensive part of it.

Mr. KEIFER. That is what you call "permanent?"

General ALLEN. Yes; when we get them in conduits we will call them "permanent."

Mr. SMITH. Do I understand you to say that the provisional system, as Colonel Abbot prefers to call it, is complete? By that you mean that the buildings of the Engineers Corps, as far as they go, are just as permanent as in the standard system?

General ALLEN. That is what I understand, Mr. Smith; that their part of it is just as permanent as mine.

Mr. SMITH. Are there no places in the United States where temporary buildings have been erected for the installation of your instruments or buildings other than standard?

General ALLEN. Oh, I think there must be buildings that will have to be removed.

Mr. SMITH. Is it not a fact that in installing this provisional, as distinguished from the standard system, they put up very temporary buildings and very inadequate buildings in many places?

General ALLEN. Well, Mr. Smith, I can not answer that definitely enough to be of value to you. That is a thing that the engineers take entire charge of. Whatever the Chief of Engineers puts in we use. They are strongly built of wood and will no doubt last many years.

UNDERGROUND CONDUITS.

Mr. SMITH. Now, the chief object of this expensive installation of the cables underground is for protection against the possibility of the wires being cut in a bombardment, is it not?

General ALLEN. Yes, sir.

Mr. SMITH. Have you any way of estimating what the danger is incidental to that?

General ALLEN. To those underground?

Mr. SMITH. To having them in the air?

Mr. KEIFER. Comparative danger, don't you mean?

Mr. SMITH. I mean this: Do you string your wires on a single pole, for instance, so that they would be all destroyed if one was destroyed?

General ALLEN. You would build the line with big poles, and if one is injured you would have a mass of wires. It has been tried. In addition to the danger of fire from the enemy, there is the trouble of maintaining it in proper shape.

Mr. SMITH. There is no more danger from storms than there is to telegraph or telephone lines?

General ALLEN. No, sir.

Mr. SMITH. What I am trying to get at is how much of an emergency there is in pressing onward with the installing of the standard system. How wide an object in an ordinary place would this mass of wires constitute?

General ALLEN. It would be an enormous mass of wires. When we started in at Fort Monroe they were all put in overhead, and everybody down there looked askance at this mass of things. It is not the proper way to put them in.

Mr. SMITH. What is it you call in the service—this line of danger?

General ALLEN. The danger zone?

Mr. SMITH. Yes. How wide would this danger zone be?

General ALLEN. For the wires?

Mr. SMITH. Yes.

General ALLEN. It would be very limited.

Mr. SMITH. Would they cover more than 2 feet in height?

General ALLEN. Yes; they would cover 6 feet in height. They would be up on a pole; probably 6 feet in height and 6 feet broad.

Mr. SMITH. That is, from the bottom crossbar to the top crossbar would be 6 feet?

General ALLEN. Approximately, yes.

Mr. SMITH. Could such a set of wires be seen from any distance at sea, so as to enable an enemy to attempt to fire directly at the wires, or would it be merely a chance if they hit you?

General ALLEN. Merely a chance in shooting at the fort.

Mr. SMITH. I do not know of anything further, gentlemen, that I want to ask of General Allen.

Mr. KEIFER. We have been over this somewhat, in various ways, heretofore. If there is anything you want to say, General, in addition, we would be glad to hear you.

CONDITION OF INSTALLATIONS.

General ALLEN. Only to tell you the present condition of affairs. We have all New York forts—Hamilton, Wadsworth, Schuyler, and Totten—all complete with permanent installation. The Baltimore district and the district of the Potomac are also permanent. We will have the Boston district, Portland, Maine, district, and the Sandy Hook district completed within six months. Partial installations in efficient condition for drill are at Fort Monroe, Forts Mott, Du Pont, and Delaware; Forts Adams, Preble, and Getty; Forts Wright, Terry, and Michie; Forts Foster, Stark, and Constitution; Forts Moultrie, Screven, Taylor, Caswell, and Dade; Forts Miley and Scott.

The money we ask for this year is mostly going out to the Pacific coast, to Seattle and San Francisco. San Francisco alone will cost as much as all New York Harbor. It is a tremendously big problem.

Mr. SMITH. Is there anything else you would like to suggest to us?

General ALLEN. Not at all, Mr. Smith. Whatever money is appropriated we will get our proportion of it. If the appropriation is cut down everybody will have to be cut down. I think it would be well to go on and get it in, because it is so important.

Mr. SMITH. We have no thought of stopping. The only problem is how rapidly it should be done, and in how much danger we would be if a war broke out while it was unfinished.

General ALLEN. You see, when you do these things hurriedly they are badly done, and the cost is great. Of course there is quite an expense for the maintenance of these things, and they wear out. I suppose 10 per cent, probably, of the whole appropriation would be taken to keep these things going and in repair.

Mr. SMITH. Many things about it, however, are not subject to material deterioration?

General ALLEN. No; those subterranean cables are practically indestructible. They ought to last for all time.

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SUPPLEMENT TO HEARINGS

BEFORE THE

U. S. Cong. H.

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,

HOUSE OF REPRESENTATIVES,

CONSISTING OF

Messrs. WALTER I. SMITH (chairman), J. W. KEIFER, J. V. GRAFF, J. J. FITZGERALD, and STEPHEN BRUNDIDGE, Jr.,

IN CHARGE OF

THE FORTIFICATION APPROPRIATION BILL.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1906.

FORTIFICATION APPROPRIATION BILL.

HOUSE OF REPRESENTATIVES,
Wednesday, December 12, 1906.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR, ACCOMPANIED BY MAJ. GEN. JOHN P. STORY, BRIG. GEN. WILLIAM CROZIER, BRIG. GEN. ARTHUR MURRAY, AND MAJ. GEORGE W. GOETHALS, U. S. ARMY.

Mr. SMITH. Mr. Secretary, the committee will now be glad to listen to any statement you may wish to make in connection with this fortification bill.

Secretary TAFT. Well, gentlemen, I doubt whether, with the exception of the Coast Artillery bill—that is, for the increase of the men in the Coast Artillery—there is anything more important in the army appropriations than these fortifications. The Endicott Board, as you may recollect, was appointed by President Cleveland in the incumbency of Mr. Endicott as Secretary of War, and that Board reported a comprehensive system of coast defenses. That was away back in 1886 or 1887, was it not?

General CROZIER. 1886. It was appointed in 1885.

Secretary TAFT. It was, of course, a system based on the then known methods of defense, and included a good deal that now would be obsolete if it had been adopted and carried out entirely. One of the great features of it was a floating defense system, which has not been adopted and is not approved now according to modern ideas, and it seemed as if the plan had become so old that there ought to be a new investigation into the matter. Accordingly a board was appointed, with the Secretary of War as the nominal head, and a lot of very technical gentlemen who understood the business as the real committee, and they made a report supplementary to that of the Endicott Board which showed that in order to put the fortifications of this country and its dependencies in proper condition and give to the fortifications all the modern machinery for making the fire effective there would be needed an expenditure of $50,000,000 for the United States proper and $19,000,000 for the dependencies, which the United States, out of the Treasury and in the fortification bill, would have to appropriate; and then, in addition to that, about $4,000,000 for fortifying the Panama Canal, if that is to be fortified.

The fortifications which we have now constructed, while some of them are a bit obsolete, are such that they can easily, with a comparatively small expense, be put into proper condition for modern purposes. But the difference between the plan of the Endicott Board and that of the present Board which necessitates additional expenditure grows out of the fact of a change in the conditions, with

reference to population and cities. For instance, Puget Sound at the time the Endicott Board sat was not regarded as an important place. Now it is an exceedingly important place, and the fortifications which should be put there are much more extensive than those which were contemplated.

DEFENSE OF CHESAPEAKE BAY.

Just why the Endicott Board did not make a provision for Chesapeake Bay perhaps I can not state definitely, except to say that they probably had in mind these floating defenses, which were to be located near the mouth of the bay. Chesapeake Bay, from a strategic standpoint, is the most vulnerable place in the United States, because it is possible now for an enemy to enter that bay and find a great many places where a landing could be effected without difficulty, free from the risk of storm, and without coming under the fire of any guns; and a great many places on the bay where we should be very much injured by attack, because you know there are a great many trunk lines that cross the bay at various points, or cross various estuaries of the bay, which ought to be protected against that kind of attack.

The difficulty of fortifying the mouth of the Chesapeake Bay is that it is so wide; and the only fortifications that have been determined upon by the Board are those which involve the construction of an artificial island on what is called the Middle Ground. In the appropriations that we ask to-day there is an item of $3,000,000, $400,000 of which is for the purchase of land on the Cape Henry side, and $2,600,000 for the construction of an island sufficiently large to make such fortification as will render that impregnable.

Now it has been frequently stated, and it is true, that as to any of the great harbors which are fortified under the Endicott Board, in those harbors it would probably be impossible for a foreign fleet to enter; but there are places where there are no fortifications, and Chesapeake Bay, except at Fortress Monroe, Baltimore, and Washington, has no fortifications, and a hostile fleet can enter without difficulty.

DEFENSE OF NEW YORK—PUGET SOUND.

So also about Long Island. The primary defenses of New York involve the construction of fortifications at the end of Long Island. That would protect some of the important cities on Long Island Sound, but that is not nearly so important as the fortification of Chesapeake Bay. Then, the fortifications of Puget Sound ought to be increased.

Now, so much for the chief item that we ask for the continental or proper United States fortification, which is the fortification of Chesapeake Bay. That is immediate; that is a thing that ought to be done at once.

There are additional expenses included in the $50,000,000 increase; the fire control, which is a method, which you gentlemen understand, by which an officer at a very considerable distance from the guns can direct the fire when the men at the guns are not able to see the target; the range finding, the searchlights, the submarines, and torpedo

work all enter into this $50,000,000. But as to those we ask not so large appropriations as the appropriations which I have spoken of for the mouth of Chesapeake Bay. The pressure is with respect to that fortification.

HONOLULU, MANILA, GUANTANAMO, AND SUBIC BAY.

But still more important, it seems to me, is the fortification of Honolulu, of Manila, of Guantanamo, and Subic Bay. Those are practically defenseless now. There is an appropriation for the fortification of Manila. That is going on, but we wish to increase that, as far as we can, so that we can put it in condition where it will be reasonably safe from attack. Now any foreign fleet could enter there without any difficulty. So, too, at Honolulu and Pearl Harbor, which is to be used as a naval station, and at Subic Bay.

ITEMS OF DOMESTIC DEFENSE.

I cut down, because I did not think it was so pressing, the estimate for gun and mortar batteries in this country. That estimate was $4,247,400. It did not seem necessary at this time to invest that money in gun and mortar batteries until we had places to put them; so that was eliminated altogether. Three hundred and forty-two thousand five hundred dollars was asked for modernizing the old emplacements—emplacements not constructed after the present methods. Then, there is an estimate for fire control in Puget Sound and San Francisco.

The fire control has been completed in eastern and southern New York, Boston, and Portland, but we think that we ought to go on and put the fire control in Puget Sound and San Francisco on the west coast. The estimate for the fortifications at the mouth of the Chesapeake, $3,000,000, I have already spoken of. Then come the preservation and repair of fortifications, $300,000. That needs no explanation. There is also an estimate for plans of fortifications, and for tools, etc., and for the construction of sea walls and embankments. Along the coast there are frequent places where the sea weakens the walls and where it is necessary to have a fund from which to strengthen them and to prevent greater damage in the future.

For the construction of mining casemates, cable galleries, etc., and the purchase of searchlight outfits for submarine mines, the estimate is $350,000. One of the things that impresses a man who goes over these estimates is that the modern system of fortification is utterly without regard to cost. We follow other nations in trying to make them as effective as possible, and they are exceedingly expensive. Then there is an estimate for the purchase, manufacture, and test of ammunition for seacoast cannon; $500,000 is estimated. That gives powder for 25 rounds per gun to 12 10-inch guns, model of 1900, and 7 rounds per gun to 103 12-inch guns, models of 1888 and 1895; projectiles for 7.9 rounds per gun for 254 3-inch rapid-fire guns, shrapnel; 8.8 rounds for 171 6-inch guns, armor-piercing shells, and 1.8 rounds for 114 12-inch guns, armor-piercing shells. Then there is an estimate for the alteration and maintenance

of seacoast artillery. The guns that are constructed according to the old model have to be altered in order to bring them within modern requirements. That requires $550,000.

After the island in the Chesapeake, I give you what is the most important things we have, and those are the insular possessions: For the construction of seacoast batteries, Guantanamo Bay, Cuba, $250,000; Honolulu, and Pearl Harbor, Hawaii, $350,000; Manila, Philippine Islands, $1,359,000, and Subic Bay, Philippine Islands, $344,000, making a total of $2,303,000.

SUBIC BAY.

Now I am aware that there will be a great discussion as to whether Subic Bay should be fortified, because there is doubt whether Subic Bay ought to be made the great naval station of the Philippines, or whether it ought to be at Cavite, opposite Manila. I don't think it makes any difference whether the one is decided to be the proper place for the naval station or the other. As it is at present, the money is being expended at Subic Bay by the Navy, and Subic Bay offers the only place where that great vessel could go which went out as a floating drydock—the *Dewey*, as you will remember. You can not get sufficient depth of water opposite to Cavite for that purpose. All this provides for would be simply fortification for that great body of water. It would be useful as a harbor of refuge, even if you did not have any naval station there at all. Yet they must have some sort of naval provision there, even if merely as a harbor of refuge, merely as a place for the fleet to go in case of war. It is easily fortified. The islands are so situated at its mouth that it will take a comparatively small amount to put it in proper condition, and it seems to me it ought to be put in proper condition without respect to the value of the naval investment that may be made in the harbor, just as a harbor itself.

Mr. KEIFER. Where is the dry dock now?

Secretary TAFT. In Subic Bay.

Mr. KEIFER. Is it put in place there?

Secretary TAFT. Yes, sir.

Mr. SMITH. It is not in the final place, Mr. Secretary, as I understand. The dredging has not all been done.

Secretary TAFT. No; it is not capable of use yet, but it was placed there because it could not be placed anywhere else.

The fire control for the same harbors is asked for, and the land site for the Hawaiian Islands; the submarine mines for the same place, and the cannon for the coast defense; the construction of batteries, and the cannon, and the other appurtenances, and then the powder.

Now, of course, I am not a technical man, and I only know this from what has been reported to me both as the head of the board and also from the bureau chiefs, whom I consulted in the matter and whose recommendations I cut down, with a view to limiting the appropriations for fortifications in the United States this year to Chesapeake Bay and to the needed fire control in the present fortifications that are important in Puget Sound and in San Francisco—we have already had fire control for the great eastern fortifications—and then the construction of the fortifications in the dependencies. I think that is all, Mr. Chairman.

THE TAFT BOARD.

Mr. SMITH. Mr. Secretary, simply to make it clear, without questioning the Executive authority: The Endicott Board was a Congressional board, created by act of Congress?

Secretary TAFT. Yes.

Mr. SMITH. The so-called "Taft board" was created by Executive order?

Secretary TAFT. Yes; merely for the information of the Department and of Congress. Nobody was put on the board except the officers of the War and Navy Departments.

Mr. SMITH. I am raising no question about the Executive authority at all. I am simply trying to get it in the record, so that it will be fresh in our minds.

FORTIFICATION OF PANAMA CANAL.

Now, Mr. Secretary, you spoke of the fortification of Panama?

Secretary TAFT. Yes.

Mr. SMITH. Is it not a fact that under international law it is improper to bombard an unfortified place except when the bombarding nation has a force ready to take possession immediately upon surrender? Is it not so regarded nowadays?

Secretary TAFT. Yes; I suppose that properly states it.

Mr. SMITH. I am not a special student of international law——

Secretary TAFT. Neither am I.

Mr. FITZGERALD. Perhaps that discussion is irrelevant. [Laughter.]

Secretary TAFT. With reference to the fortification of Panama, if that is thought safe to let it go without fortifying, I would rather prefer it.

Mr. SMITH. So far as you know, there has been no effort made by the American Government to negotiate treaties with the great powers for the protection of the Panama Canal in time of peace or war.

Secretary TAFT. No, sir.

Mr. SMITH. As a matter of fact, under the treaty with Great Britain, you understand, do you not, that we have to permit the war vessels of an alien enemy to pass through there, even in time of war, do we not?

Secretary TAFT. I do not think that necessarily follows. I examined it once, but my recollection of it is very dim. I think we have the authority to notify under that treaty.

Mr. SMITH. I read the treaty with great care, with that in mind, and my understanding of it is that we are bound to let war vessels of alien enemies come through there in time of war.

Secretary TAFT. I do not think there is such a provision in there.

Mr. SMITH. The provision is not in those words, but that is the idea.

Secretary TAFT. I should doubt that, Mr. Chairman. The language is not as clear as it might be.

Mr. KEIFER. I do not think the treaty covers that.

Secretary TAFT. Of course these appropriations do not cover the Panama Canal, you understand, because the Spooner Act specifically provides that out of the $135,000,000 the expenses of fortification such as are thought wise, may be made.

Mr. SMITH. Now, I do not question the right to fortify——

Mr. KEIFER. Let me make a suggestion, Mr. Chairman. I do not think the Secretary should be examined as to the possible effect of a treaty, to go into our printed record.

Mr. SMITH. This is not for the general printed record. This is for the committee.

Mr. KEIFER. I make the suggestion that it be left out, no matter what his views may be. We are not involved in that question.

Mr. SMITH. Now, I do not question the right of the United States to fortify the canal for the purpose of protecting the canal, but I am unable personally to see what object is to be attained by it if we are not enabled to exclude war vessels of a nation from the canal, because the world would undoubtedly be willing to stipulate with us for the protection of this canal in time of war.

Secretary TAFT. Fortifications would not be needed except to prevent the coming in of vessels of irresponsible governments; of governments that would not be governed by such a treaty.

Mr. SMITH. I have no question about our right to fortify and protect it under the treaty, but that does not contravene the idea expressly that they are not entitled to take their vessels through it in time of war.

Secretary TAFT. It is a great deal better for the canal not to have fortifications and to have it absolutely clear, as the Suez Canal is, because the present plan involves dams and locks immediately on the Pacific shore, and we either ought to have heavy fortifications to keep the vessels sufficiently far away from them as not to destroy the locks that might be destroyed by heavy gun fire, or else we should have provision which would make that entirely neutral. I think if you interrogated some gentlemen in the Senate you would find that one of the objections made to the Hay-Pauncefote treaty was that that particular provision was contemplated—that is, that an alien enemy could go through there without our objection.

Mr. SMITH. That is my understanding.

Secretary TAFT. But, you know, that treaty did not pass.

Mr. SMITH. But the final treaty which did pass contains a provision which clearly implies that they can go through there.

Secretary TAFT. One of the great fights against the Hay-Pauncefote treaty was that it did not permit us to prevent an enemy going through there.

Mr. KEIFER. Now, then, will it not be quite satisfactory to at least lay aside that matter, so far as appropriations are concerned, for the present, and let developments come later?

Mr. SMITH. There is nothing in the estimates for it. It was brought up simply because the Secretary referred to the Taft board's having provided for the expenditure of $4,000,000 there, if it was contemplated to fortify it.

DEFENSE OF CHESAPEAKE BAY (AGAIN).

Now, Mr. Secretary, you spoke of the most important point being the mouth of the Chesapeake. All the large cities within the capes are now fortified?

Secretary TAFT. Yes, sir; and fortified so heavily that there is no danger of their being taken.

Mr. SMITH. Now, when the Chief of Engineers of the Army was

here the other day he was interrogated as to where the title was to this shoal upon which it was proposed to erect this artificial island. He was unable to give us definite information, but thought it was in the State of Virginia. If that was true, the Government could not obtain title in any probability to that area within the next fiscal year, so as to make it important whether the money was appropriated this year or the next; and the Chief of Engineers told us that he would furnish us with information later as to where the title rested, and if it was in the State of Virginia he would tell us whether it was in the authority of the governor or any other officer to convey it without an act of the Virginia legislature, and, if not, he would tell us when the legislature would assemble in Virginia, so that we could tell, if possible, when title could be got for this property.

Secretary TAFT. Don't you think you had better give us the money and allow us to get the title?

Mr. SMITH. I do not think this committee ought to give you the money unless you could get title before the next bill passes. If it appeared that you could not, I doubt if Congress would want to make the appropriation.

Secretary TAFT. I know they are very anxious to have it down there.

Mr. SMITH. Suppose you had the money, how long would it take to construct the artificial island? Do your estimates show anything on that?

Secretary TAFT. No, sir; but I think it was stated. How much was it, General?

General MURRAY. Two years and a half.

Mr. SMITH. Manifestly you have no use for it now.

Secretary TAFT. Oh, if anything is likely to produce poor work, it would be the giving to us piecemeal amounts for such an entire job as that.

Mr. SMITH. Did not the estimate come in to you for $3,310,000 for this land at Cape Henry, and this artificial island, and did you not cut the estimate to $3,000,000?

Secretary TAFT. Yes. That other sum was for the construction of the batteries.

General MURRAY. Two million six hundred thousand dollars was asked for the island, just as you have given it. Five hundred and thirty thousand dollars, I think, was asked for the purchase of land at Cape Henry and Fishermans Island; $500,000 at Cape Henry, and $30,000 for Fishermans Island. That was cut by you $400,000, to provide for the purchase of the land, presumably at both places.

Mr. BRUNDIDGE. Mr. Chairman, I would like to ask Mr. Secretary one question.

Secretary TAFT. My recollection is that I asked about the contract. I can not carry it in mind, and I have not examined the estimate recently, but I asked about the contract that it was necessary to make, and the engineers thought that if they got $2,600,000 for that they would make a contract that would be a unit and work properly.

Major GOETHALS. That is possibly correct, because the estimate of $2,600,000 contemplated the construction of a breakwater, if necessary.

Mr. SMITH. Does not the Engineer Department know whether a breakwater will be necessary?

Major GOETHALS. No, sir. Nobody can tell until the island is constructed.

Mr. BRUNDIDGE. I want to ask you, Mr. Secretary, this: If you do not know yet what the title is, in whom it rests, or when we will be able to acquire it, or what it will cost, how can you make an estimate?

Secretary TAFT. I think the cost of the land itself would not be very great on that middle ground.

Mr. SMITH. I do not suppose it would cost much in the State of Virginia.

Mr. KEIFER. My understanding is that they do not regard the value of the land very highly.

Mr. SMITH. There is no probability of getting title within more than a year from now?

Secretary TAFT. I do not know.

Mr. SMITH. I understand no session of the legislature of Virginia meets until next winter.

Secretary TAFT. I do not know about that.

Mr. SMITH. We inquired of the engineers, and there seemed to be no information forthcoming about it.

Secretary TAFT. You just give us the money, and we will get the fortification.

General STORY. After the money is appropriated they acquire title to the land, but they can not get title until they know that they are able to buy.

Mr. SMITH. The custom has been to appropriate money separately for a site and then appropriate for the construction of the work. Here the assumption is that there will be no money for the site. Why should Congress appropriate money for the construction of a work upon a shoal in Chesapeake Bay if, as we surmise, you can not get any title until the legislature of Virginia meets in this coming winter? We may be in error as to that, but that is what we surmise.

General MURRAY. I think the shoal you now speak of is covered with 15 or 20 feet of water, and that ought not to be very valuable land to the State of Virginia.

Mr. FITZGERALD. But it might take just as long to get it as if it were 15 feet above water.

Mr. SMITH. Now, Mr. Secretary, I have no authority to speak for these other gentlemen, but I presume that a very controlling factor as to whether you will be given recommendation from the committee on this Chesapeake matter will be whether there is any possibility of your getting any title or doing any work before the next fortification bill passes. If, as a matter of fact, you can not get any title until the legislature of Virginia meets, and it does not meet this winter, I should say it was highly doubtful whether the committee would feel like recommending a large appropriation for this year. These appropriations, as you know, are available on the day the bill passes and remain forever available until expended. They never lapse and are not governed by the covering-in act. Whenever we pass the bill these appropriations become immediately available.

Mr. FITZGERALD. This bill is different from any other bill, Mr. Secretary, in that respect.

Secretary TAFT. I did not understand that. I would ask you not to pass upon that, however, until we can find out. I am not sure about the question of title. I think it is in the State of Virginia, but I am not sure. However, I am sure there are some people in the State of Virginia who are very anxious to have this done, and so far as the delay from Virginia is concerned I do not think that will be formidable.

Mr. KEIFER. I want to make a suggestion—that if the appropriation were made it could be made so that the money would not be expended until the site was obtained.

Secretary TAFT. We could not do that under the law.

Mr. SMITH. I suggest that the Secretary get this information. It would be beneficial.

Secretary TAFT. You are sure about the legislature of Virginia, are you?

Mr. SMITH. I am not sure about anything, Mr. Secretary. We could not get any information from the Chief of Engineers as to where this title rested.

Secretary TAFT. I have a number of gentlemen coming to see me about a million dollar loan to the exposition at Jamestown who represent Virginia very largely, and I think they will be perfectly willing to agitate the question.

Mr. KEIFER. Some gentlemen from there talked to me as though the government of Virginia owned that now, but I am not sure that that is true.

Mr. SMITH. The Chief of Engineers told me he would furnish that information. If he has done so it has been by amending his notes, which I have not seen.

Major GOETHALS. He told me that he was sure that the United States would have to acquire title to that bottom, but that he was not certain yet whether the legislature met next year or this year, or whether the power was in the hands of the governor for ceding the land.

Mr. SMITH. I am satisfied the legislature does not meet until next winter, because they inaugurated their governor a year ago.

Now, Mr. Secretary, passing for the present from continental United States——

Mr. FITZGERALD. Before you take that up I would like to ask the Secretary two questions. One is as to the imperativeness of doing this at once. How pressing is this? How necessary is it?

Secretary TAFT. It is only the beginning of having sufficient fortifications for this country. That is all.

Mr. FITZGERALD. I mean, is it the opinion of the Department or the proper officials that this work should be initiated now?

Secretary TAFT. Yes, sir; it is, because it is going to take a long time, at any rate, and it is the weak spot in the fortification system of this country, and is so regarded by the engineers and the Navy. The Navy people are more strenuous about it, a great deal, than we have been. Understand me, Norfolk, Richmond, Fortress Monroe, Newport News are all amply fortified. Fortress Monroe is ample to protect them; so as to Washington. Nothing could come up here at all. Nothing could get to Baltimore. But that is not the point. The point is that if we get into a war a foreign fleet could make the Chesapeake Bay their base in this country.

Mr. KEIFER. In that event we would have to have a navy there to defend it?

Secretary TAFT. Yes. The presumption is that there is going to be a war, and that a navy will try to come in. Assuming those things, the fortification of Chesapeake Bay is very important.

Mr. FITZGERALD. The other point I wanted to ask you about is the estimate for the purchase of some land at Cape Henry—that is the place, is it not?

Secretary TAFT. That is involved in the same fortification.

Mr. FITZGERALD. The estimate is about half a million dollars?

Secretary TAFT. Yes.

Mr. FITZGERALD. That seems to be like a New York price.

Secretary TAFT. It is.

Mr. FITZGERALD. Can you tell us anything of the character or location of this land?

Secretary TAFT. The price has approximated or enhanced as the necessity for the construction of the fortification is supposed to have grown. The estimate is made by the engineer after having made inquiries as to what is needed.

Mr. FITZGERALD. Is there any city or settlement near there?

Secretary TAFT. No; there is only a very small settlement there.

Major GOETHALS. It is owned by a syndicate. A lot of people have clubbed together for the purpose of buying that land, to sell it to the Government. Several bills have been introduced in Congress for the purpose of buying it.

Mr. FITZGERALD. Condemnation proceedings would probably be the course to pursue in that case.

Secretary TAFT. We would condemn it.

General STORY. They have built an electric tramway from Norfolk in the last few years, and they have made a sort of seaside resort there. They are holding the prices very high for that reason.

Mr. FITZGERALD. They might go through the motions of doing that in order to enhance the value of the land for the purpose of creating fictitious values in this proposed sale. I would not care, myself, to be a party to authorizing the purchase of the land if I felt that those who controlled it entered into such a movement to coerce the Government. I would prefer to let that place go defenseless.

Secretary TAFT. Those are not the people who would be hurt.

Mr. KEIFER. If they were all that were involved I would agree with you, but I think the sooner we get that land the cheaper it will be to the Government.

Mr. FITZGERALD. About how much land is involved there?

General STORY. The limits of it are very carefully marked, but it is nearly a year since we submitted the report.

Secretary TAFT. I can send that in.

Mr. SMITH. I wanted to ask a few questions about these insular fortifications.

Secretary TAFT. Yes, sir.

DEFENSE OF HAWAIIAN ISLANDS AND THE PHILIPPINES.

Mr. SMITH. You are aware that this committee last year voted and reported to the House, and the House passed, a bill giving you $600,000 for the construction of seacoast batteries in the Hawaiian

and Philippine islands, and that the Senate struck out the Philippine Islands——

Secretary TAFT. And they did it because of this fight over Subic Bay and Manila.

Mr. SMITH. I would not be clear that it was altogether on that account, because a motion was pending to exclude Subic Bay, and it was announced that another motion, if carried, would make that motion unnecessary to be passed upon; and then, as I remember, Senator Lodge made a motion to strike the Philippines out, which carried, and thus disposed of the motion to strike Subic Bay out alone. Now, in view of that history and of the difficulty which the House experienced in getting the Philippines back in, nominally I have not supposed there was any prospect of being able to get through both Houses a large appropriation for the Philippine Islands.

Secretary TAFT. Of course you know better about that than I do, gentlemen. All I know is that we need it, and would like to have it, and at some time the question ought to be decided. I understood Mr. Lodge made the motion because he was very strongly of the naval view, that Subic Bay ought to be fortified; and therefore, rather than have a provision which indicated a doubt upon that subject, he preferred to have none. I think it was unfortunate. It was carried by the Democrats, with the aid of a few Republicans. That is my recollection.

Mr. FITZGERALD. They were patriotic gentlemen.

Secretary TAFT. Mr. Lodge was among them.

SUBIC BAY (AGAIN).

Mr. KEIFER. In the House Subic Bay was distinctly put in our bill.

General STORY. The objection to Subic Bay comes from a very few naval officers, assisted by a few army officers of rank.

Mr. FITZGERALD. An army officer told me that the proposition of defending Rome without fortifying the seven hills about it would not be anything in comparison with the difficulty of fortifying Subic Bay without a string of fortifications around the surrounding hills. He said that there were a dozen places that could be taken possession of and fortified, which would make utterly worthless all the fortifications you could make in Subic Bay. This was a pretty intelligent army officer.

Secretary TAFT. I can tell you the history of it. General Corbin, General Wood, and Admiral Folger, after the naval board here had decided upon the fortification of Subic Bay, wrote a communication here protesting against it, and it was taken up again by the general board of the Navy with Admiral Dewey and Admiral Taylor, and they made a long report, in which they considered all the objections, and reported with great emphasis in favor of Subic Bay.

General STORY. You remember the President wrote a letter and said the reasons were absolutely satisfactory to him.

Secretary TAFT. I remember the President approved. It is a naval fight. It is not our fight. Admiral Folger became so excited on the subject that he resigned or retired as commander in chief of the fleet, after serving one day, because his views on that subject had

not been accepted, at least so it was said. In the meantime, in the absence of a decision one way or the other, we are doing nothing.

Mr. SMITH. I will say, Mr. Secretary, that I think the policy of this committee has been very largely, so to speak, to follow the Naval Committee and the action of Congress with reference to its reports as to both Guantanamo and Subic Bay. I think this committee has always been willing to fortify either of these places, if provision was made for anything of importance at either of those places.

MANILA.

Secretary TAFT. So far as that is concerned, if the committee is in any way doubtful about it at all, rather than lose the appropriation I would prefer that you leave out Subic Bay and Guantanamo, but leave us enough for Manila.

Mr. FITZGERALD. You think we ought to protect Manila at present?

Secretary TAFT. Yes; I think it is a weakness that we have there—that any nation could just enter there and take them. You know if you take Manila you take the Philippines.

Mr. FITZGERALD. You think that as long as we have the Philippines we should protect them?

Secretary TAFT. Yes; I think we should not lie around and neglect that.

Mr. SMITH. Now, if Congress appropriates money for the construction of seacoast batteries and leaves it to the discretion of you people as to where it should be spent, you think that would be a practicable way out of the difficulty?

Secretary TAFT. If you will give us a lump sum we will probably put it all in Manila, because Manila is important to us from the army standpoint.

Mr. FITZGERALD. Is not Manila the objective you have in mind in fortifying Subic Bay?

Secretary TAFT. Yes. The theory on which they favor the fortification of Subic Bay is that no foreign fleet would dare enter Manila Bay if an American fleet was in Subic Bay. They, of course, do not say that we ought not to have fortifications at Manila, but they say we ought to have them in Subic Bay. We ought to have fortifications at Manila anyway.

General STORY. Vessels can pass into Manila Bay beyond 7 miles' distance of the guns on Corregidor Island.

Secretary TAFT. He says that with the present emplacement of guns provided for it would not cover the passage south of Corregidor Island.

Mr. FITZGERALD. And that is at Manila?

Secretary TAFT. Yes; that is at Manila. If you give us this money there are other islands there that could be utilized, and possibly we could do something on the shore also.

Mr. KEIFER. Would not Subic Bay be left open in order to make it a base in operations against Manila? Is not that about as important a consideration as there is?

Major GOETHALS. When Admiral Dewey made an investigation as to the whereabouts of the Spanish fleet before the battle of Manila Bay, he investigated Subic Bay first before daring to enter Manila Bay. He expected to find them in Subic Bay.

Mr. FITZGERALD. Nobody believes that if Manila was fortified and an American fleet was there, a foreign fleet could come there and occupy Subic Bay, and that the enemy's vessels could be so superior to the American fleet as to bottle it up?

Major GOETHALS. Oh, yes; they could make sorties.

General STORY. Manila Bay is certainly a very difficult problem.

General CROZIER. As to the necessity of occupying the neighboring hills on each side of the harbor, that would not be at all necessary in order to keep a fleet out of the harbor. The occupation of the sites in the mouth of Subic Bay would amply suffice for that. Of course an enemy could establish himself on the heights and carry up guns of the smaller size to assault these fortifications; but the whole theory of this coast defense, both for the insular possessions and the United States, is not that there would be anything to prevent such a landing as that, but to force the enemy to make a landing and then it is expected he is to be taken care of by the mobile army.

Mr. SMITH. I think you made that point as to its being necessary to occupy the surrounding heights in order to retain these fortifications free from such a bombardment as might be made.

Secretary TAFT. My guess is, with some familiarity with the hills around Subic Bay, that an enemy would have a big job on his hands to take them.

Mr. FITZGERALD. That is generally the case in an enterprise of that kind.

Secretary TAFT. The mountain range running back of Subic Bay opposite Manila is about 4,000 feet high.

Mr. FITZGERALD. I may differ with the majority of the committee, and that is why I wish to get this in the record if I can. Is it not the part of wisdom to get, if possible, money to fortify what we believe to be the most important places to fortify in the Philippine Islands?

Secretary TAFT. Yes, sir.

Mr. FITZGERALD. Is there anything particularly at Subic Bay now that requires more money than has been appropriated. If we were correctly informed, there were $455,000 allotted out of the appropriation made in 1905 for Subic Bay that had not been used; and that had some influence, I think, last year upon the action that was taken.

Secretary TAFT. There is this to be said: Subic Bay is so easily fortified, and Manila is so hard to fortify, that I would rather begin with the fortifications at Manila than at Subic Bay. At the latter place they could be almost improvised.

General CROZIER. There has been provided for Subic Bay six 6-inch guns and three 10-inch guns.

Mr. FITZGERALD. Has the money been appropriated for the emplacements?

General CROZIER. Yes, sir; they are now under construction.

Mr. FITZGERALD. How many guns are contemplated there at Subic Bay?

General CROZIER. There was an estimate in this bill for four small guns, 15-pounders, and two 12-inch guns.

Mr. FITZGERALD. You have provided for so many; what is the full complement of guns that has been determined upon?

Secretary TAFT. Four 12-inch, twelve 3-inch guns, and eight mortars.

Mr. FITZGERALD. You have provided how many 10-inch guns?

General CROZIER. Three 10-inch guns—that is, that have been allowed by the Secretary in addition to those already provided.

General STORY. These do not include existing fortifications.

Mr. FITZGERALD. What I was trying to find out was, how many guns, in addition to those already provided, is it necessary to make provision for?

Secretary TAFT. Four 12-inch guns, twelve 3-inch guns, and eight 12-inch mortars at Subic Bay; and for Manila, eight 14-inch, two 12-inch, four 6-inch, twelve 3-inch, and eight mortars in addition to those already provided.

General CROZIER. Those provided thus far for Manila Bay are three 6-inch and six 12-inch guns and four 12-inch mortars.

Mr. SMITH. Has the $260,000 appropriated for the seacoast batteries in the Philippine Islands in the last fortification bill been apportioned or allotted?

Secretary TAFT. What do you mean by allotted—divided up, part to one and part to the other?

Mr. KEIFER. Set aside for special use.

Mr. SMITH. That is the term that has been constantly used in reference to this fund, and used by myself. But how much for Subic Bay, how much to Manila, and how much to Hawaii?

Secretary TAFT. I understand it has been assigned. I ought to say, if you will permit me, that I sent General Story out to Honolulu, to Japan, to Guam, and to Manila as a member of this board, for the purpose of going over the places that have been selected with a view to making certain that they had been rightly selected. The men who were there were young officers with not so much experience in the matter of fortifications, and it seems likely that we shall have to change the locations in Honolulu as not best adapted for the fortifications; and, too, changes have been made in the proposed batteries about Manila, or rather about Corregidor.

Mr. SMITH. But how has that $260,000 been allotted; how much to Honolulu, how much to Manila, and how much to Subic Bay? The last year appropriation is $260,000 for all of it, and what I am asking is whether that has been allotted yet to the Hawaiian Islands.

Major GOETHALS. That is a matter in the hands of the Chief of Engineers.

General CROZIER. I can tell you it has not been allotted to the Hawaiian Islands, though part of it has been. I will place in the Philippines three 6-inch guns, four 12-inch guns, using funds that were appropriated by the act of last June.

Mr. SMITH. But none of the gentlemen here know what allotments have been made for the Philippines and for Honolulu.

General CROZIER. The Chief of Engineers, I think.

Mr. GRAFF. I understood it was already allotted for the Hawaiian Islands.

Mr. SMITH. I understood from the Chief of Engineers that it had never been allotted at all, but I may, of course, have misunderstood him.

Mr. GRAFF. Let me ask, does there have to be an excavation at Manila Bay to complete your scheme—an excavation for the purpose of getting a greater depth of water?

Secretary TAFT. If you shall have to establish a naval station there, the dredging will have to be enormous; but if you do not, and I don't know that there will have to be, they will have to excavate into the hills to make emplacements, but I do not think any excavation would be necessary in the harbor.

General CROZIER. I would like to add, with reference to the statement that I was going to place some guns in the Philippine Islands from that appropriation, I would call your attention to the fact that there was no inconsistency in that statement, because this appropriation was made separately. The appropriation for guns, carriages, and so forth, does not contain any reference to the Philippine Islands.

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